
Analog and Mixed-Signal Products

Designer's Guide and Reference

August 1999

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Designer's Guide & Reference

August 1999



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FOURTH EDITION

Analog
&

Mixed-Signal
Products

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&
Reference

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How to use this document

This fourth edition of TI's *Analog & Mixed-Signal Products Designer's Guide & Reference* is designed to offer you the tools to quickly identify the most appropriate analog and mixed-signal products for new designs. It is intended to supplement and index, but not to replace, a complete library of product databooks. It is important to note two other vital resources for product information: 1) the InfoNavigator CD-ROM (literature # SLYC005C), and 2) the **Semiconductor** products category at the TI WEB site www.ti.com.

New Product Previews

In the front of each section are New Product Previews showcasing products that are expected to release in late 1999. Use the resources and contacts in Appendix B to reach us directly to discuss your needs.

Decision Trees

Most chapters are structured to guide you through the process of narrowing your choice of appropriate products based on your key careabouts and specifications. The table of contents for each section will direct you to the specific product category of interest—no need to dig for information. For example, in Chapter 1, Amplifiers are broken into categories like “low noise,” “single-supply,” “low voltage,” etc. Once you start with these broader categories, the branches of the tree narrow your choice of devices by further qualifying the search criteria.

Selection Guides

Following each decision tree (or chart) is a table of specifications most appropriately associated with products in that category, sorted by the specification that best represents your chief concern. “Low Noise Op Amps,” for example, are sorted by noise figure, from lowest to highest. Other specifications in these tables relate most to applications where these devices would be used. These Selection Guides let you quickly compare key specs to choose a single device, or devices, from among those segregated by the decision trees. From here you should refer to the individual product datasheets (listed in Appendix D) for complete specifications.

NEW

Analog/DSP Compatibility Reference Guide (Appendix A)

When designing with DSPs, designers face multiple challenges, not the least of which is determining how power will be managed in the system and how the system will translate analog data to digital data and vice versa. To aid the designer in this sometimes difficult process, Appendix A has been included to help identify Data Converter and Power Management products that are compatible and optimized for our powerful family of DSPs.

Ordering Guide

Appendix C provides a general ordering guide to help you identify device numbers for each product group. The package suffix options for a particular device can be located in Appendix D. With this information, the ordering guide helps you construct the full device part number.

Other Documentation and Contact Information

Appendix B includes a current list of databooks, applications notes and other literature, and evaluation modules. Contacts for ordering these documents or for technical assistance are also listed here. Appendix D includes a literature number for the technical document that covers each device. Two other resources for product information are: 1) the InfoNavigator CD-ROM (literature # SLYC005C), and 2) the **Semiconductor** products category at the TI WEB site www.ti.com.

Index

Appendix D is an index of Texas Instruments Analog & Mixed-Signal Products. The index will tell you the device family, what chapter to find it in, the literature number of the most current datasheet, and the package suffix options for each device. Package suffix definitions are in Appendix C. When you're looking for information about an unidentified device, this index is the place to start.

Samples and Literature

If you have questions or you want to order samples, request any of the literature in Appendix B or D, or order additional copies of this guide, see Contact Information in Appendix B.

For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

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1—Amplifiers & Comparators

AMPLIFIERS &
COMPARATORS

2—Data Converters

DATA
CONVERTERS

3—Interface Products

INTERFACE
PRODUCTS

4—Power Management Products

POWER
MANAGEMENT
PRODUCTS

5—Power Drivers

POWER
DRIVERS

6—Clock Drivers & Timers

CLOCK DRIVERS
& TIMERS

7—Microcontrollers

MICRO-
CONTROLLERS

8—RF Products

RF PRODUCTS

Appendices

Appendix A—Analog/DSP Compatibility Reference Guide

Appendix B—Resources & Contact Information

Appendix C—Device Number Ordering Guide

Appendix D—Device Index for Analog & Mixed-Signal Products

APPENDICES
A, B, C, D

1—Amplifiers & Comparators

2—Data Converters

3—Interface Products

4—Power Management Products

5—Power Drivers

6—Clock Drivers & Timers

7—Microcontrollers

8—RF Products

Appendices

Appendix A—Analog/DSP Compatibility Reference Guide

Appendix B—Resources & Contact Information

Appendix C—Device Number Ordering Guide

Appendix D—Device Index for Analog & Mixed-Signal Products

Amplifiers & Comparators

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For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

Amplifiers & Comparators New Product Previews

The following new devices are expected to be released in the near future. For more information, please refer to the InfoNavigator CD-ROM, literature number SLYC005C.

Device	Description
--------	-------------

Single Supply Op Amps

TLV240x	Family of RRIO Ultra-Low-Power Op Amps
TLV2452	Dual 3-V/5-V, 23- μ A/ch, 220-kHz RRIO Op Amp
TLV2453	Dual 3-V/5-V, 23- μ A/ch, 220-kHz RRIO Op Amp with Shutdown
TLV2470	Single RRIO, 2.8-MHz High-Output Drive Op Amp with Shutdown
TLV2471	Single RRIO, 2.8-MHz High-Output Drive Op Amp
TLV2472	Dual RRIO, 2.8-MHz High-Output Drive Op Amp
TLV2473	Dual RRIO, 2.8-MHz High-Output Drive Op Amp with Shutdown
TLV2474	Quad RRIO, 2.8-MHz High-Output Drive Op Amp
TLV2475	Quad RRIO, 2.8-MHz High-Output Drive Op Amp with Shutdown
TLC07x	Complete Family of 4.5 - 16-V, Wide Bandwidth, High-Output Drive, Low Noise Op Amps
TLC08x	Complete Family of 4.5 - 16-V, Wide Bandwidth, High-Output Drive, Low Noise Op Amps (Input Includes Negative Rail)

High-Speed Amplifiers

THS4011	290-MHz Low-Distortion Amplifier
THS4012	Dual 290-MHz Low-Distortion Amplifier
THS4041	180-MHz C-Stable High-Speed Amplifier
THS4042	180-MHz C-Stable High-Speed Amplifiers
THS4051	70-MHz High-Speed Amplifier
THS4052	70-MHz High-Speed Amplifiers

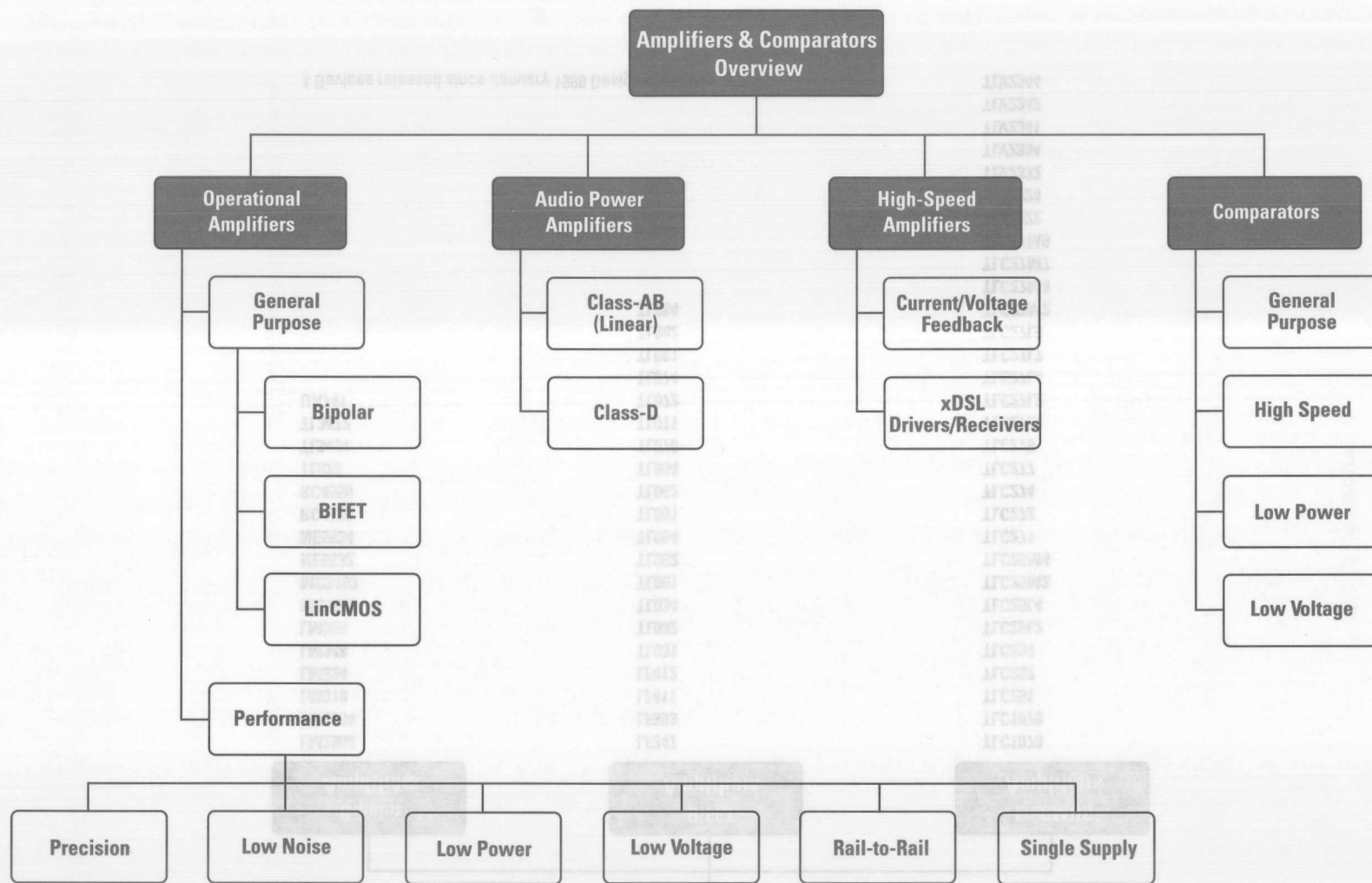
Audio Power Amplifiers

TPA0122	Stereo 2W APA (Audio Power Amp) with Internal Gain Settings
TPA0142	Stereo 2W APA with DC Volume Control
TPA0152	Stereo 2W APA with Digital Volume Control
TPA0162	Stereo 2W APA with Digital Volume Control
TPA005D12	Class-D Stereo 2W APA
TPA005D14	Class-D Stereo 2W APA with Headphone Drive
TPA032D02	Class-D Stereo 10W APA
TPA032D04	Class-D Stereo 10W APA with Headphone Drive

Web Locations for Specific Product Groups

Amplifiers & Comparators	www.ti.com/sc/docs/products/msp/amp_comp/default.htm
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Amplifiers & Comparators Overview



General Purpose Op Amps

General Purpose
Amplifiers

Bipolar
Amplifiers

LM2902
LM2904
LM318
LM324
LM348
LM358
MC1458
MC3403
NE5532
NE5534
RC4136
RC4558
TL022
TL343†
TL3472
UA741

BiFET
Amplifiers

LF347
LF353
LF411
LF412
TL031
TL032
TL034
TL051
TL052
TL054
TL061
TL062
TL064
TL070
TL071
TL072
TL074
TL081
TL082
TL084

LinCMOS
Amplifiers

TLC1078
TLC1079
TLC251
TLC252
TLC254
TLC25L2
TLC25L4
TLC25M2
TLC25M4
TLC271
TLC272
TLC274
TLC277
TLC279
TLC27L1
TLC27L2
TLC27L4
TLC27L7
TLC27L9
TLC27M2
TLC27M4
TLC27M7
TLC27M9
TLV2322
TLV2324
TLV2332
TLV2334
TLV2341
TLV2342
TLV2344

† Devices released since January 1999 Designer's Guide

General Purpose Op Amps

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (mV)		I_{IB} (μ A)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max	typ	max						
Bipolar												
LM2902	4	26	0.175	0.3	3	7	−20	80	0.25	0.4	23	Quad General-Purpose
LM2904	4	26	0.5	1	3	7	−20	80	0.15	0.4	23	Dual General-Purpose
LM318	±5	±20	5	10	4	10	150	100	70	15	23	Single High-Speed
LM324	4	32	0.175	0.3	3	7	−20	80	0.25	0.4	23	Quad General-Purpose
LM348	±4	±18	0.6	1.125	1	6	30	90	0.5	1	23	Quad General-Purpose
LM358	4	32	0.5	1	2 to 3	3 to 7	−20	80		0.4	23	Dual General-Purpose
MC1458	±5	±15	1.7	2.8	1	6	80	90	0.5	1	45	Dual General-Purpose
MC3403	5	30	0.7	1.75	2	10	−200	90	0.6	1		Quad Low-Power General-Purpose
NE5532	3	20	4	8	0.5	4	200	100	9	10	5	Dual Low-Noise High-Speed Audio
NE5534	3	20	4	8	0.5	4	500	100	13	10	3.5	Low-Noise High-Speed Audio
RC4136	±5	±18	1.25	2.825	0.5	6	140	90	1.7	3	8	Quad General-Purpose
RC4558	±5	±18	1.25	2.8	0.5	6	150	90	1.7	3	8	Dual General-Purpose
TL022	±5	±18	0.065	0.125	1	5	100	72		0.5	50	Dual Low-Power General-Purpose
TL343†	5	30	0.7	2.8	2	10	−0.2	90	1.0	1		Single General-Purpose
TL3472	4	36	3.5	4.5	1.5	10	100	97	10	4	49	Dual High-Speed
UA741	±3.5	±18	1.7	2.8	1	6	80	90	0.5			General-Purpose
BiFET												
LF347	±3.5	±18	2	3.75	3 to 5	5 to 10	0.05	100	13	3	18	Quad General-Purpose JFET-Input
LF353	±3.5	±18	1.8	3.25	5	10	0.05	100	13	3	18	Dual General-Purpose JFET-Input
LF411	±3.5	±18	2	3.4	0.8	2	0.05	100	13	3	18	Precision JFET-Input
LF412	±3.5	±18	2.25	3.4	1	3	0.05	100	13	3	18	Dual JFET-Input
TL031	±5	±18	0.217	0.28	0.34 to 0.5	0.8 to 1.5	0.002	94	5.1	1.1	41	Enhanced JFET Low-Power Precision
TL032	±5	±18	0.111	0.28	0.39 to 0.57	0.8 to 1.5	0.002	94	5.1	1.1	41	Dual Enhanced JFET Low-Power Precision
TL034	±5	±18	0.2175	0.28	0.58 to 0.79	1.5 to 4	0.002	94	5.1	1.1	43	Quad Enhanced JFET Low-Power Precision
TL051	±5	±18	2.7	3.2	0.35 to 0.59	0.8 to 1.5	0.03	93	20	3.1	18	Enhanced JFET Precision
TL052	±5	±18	2.4	2.8	0.4 to 0.65	0.8 to 1.5	0.03	93	20.7	3	19	Dual Enhanced JFET Precision
TL054	±5	±18	2.1	2.8	0.5 to 0.56	1.5 to 4	0.03	92	17.8	2.7	21	Quad Enhanced JFET Precision
TL061	±3.5	±18	0.2	0.25	2 to 3	3 to 15	0.03	86	3.5	1	42	Low-Power JFET-Input General-Purpose
TL062	±3.5	±18	0.2	0.25	2 to 3	3 to 15	0.03	86	3.5	1	42	Dual Low-Power JFET-Input General-Purpose

† Devices released since January 1999 Designer's Guide

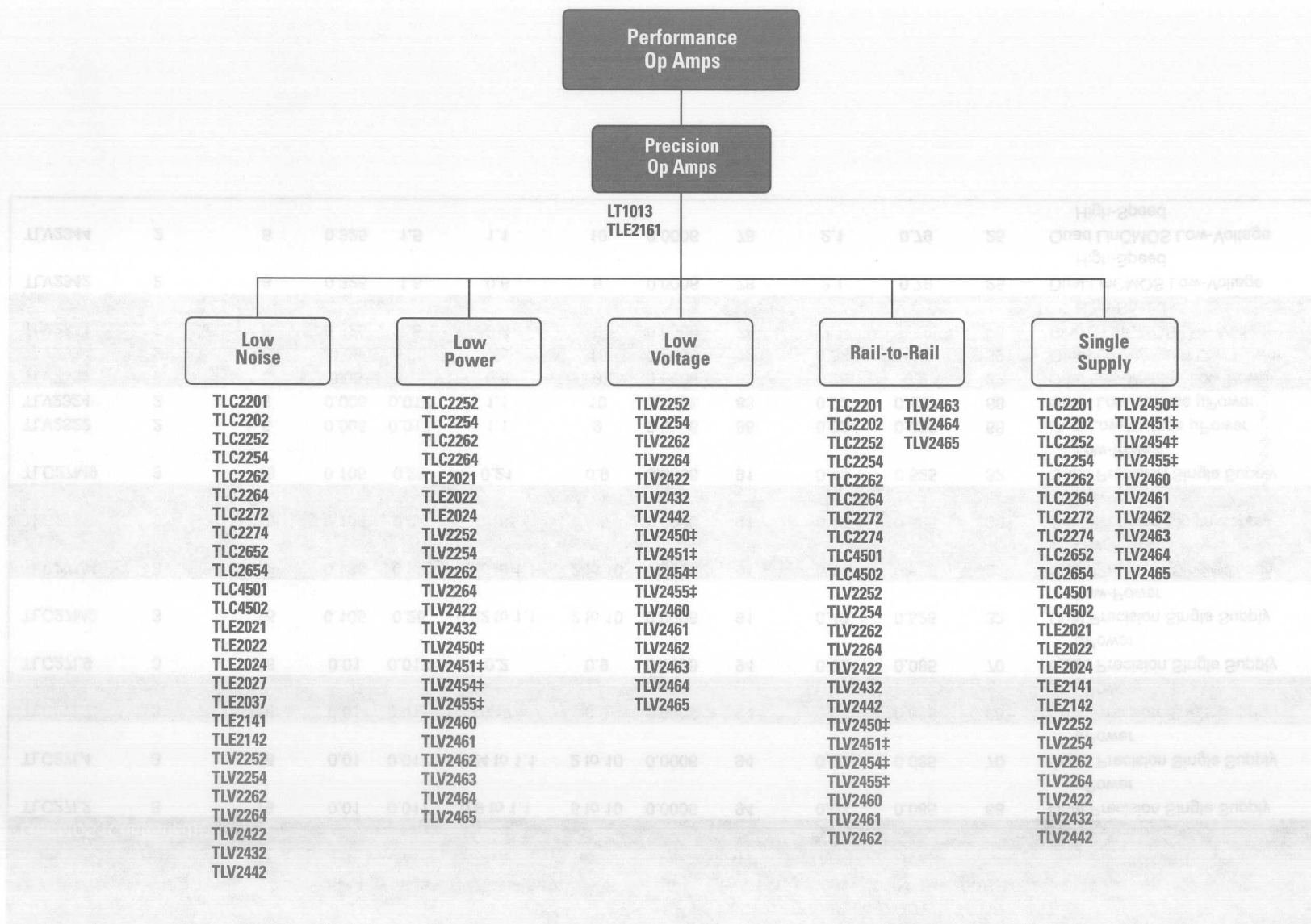
General Purpose Op Amps (Continued)

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (mV)		I_{IB} (μ A)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max	typ	max						
BiFET (Continued)												
TL064	± 3.5	± 18	0.2	0.25	2 to 3	3 to 15	0.03	86	3.5	1	42	Quad Low-Power JFET-Input General-Purpose
TL070	± 3.5	± 18	1.4	2.5	3	10	0.065	100	13	3	18	Low-Noise JFET-Input Decompensated
TL071	± 3.5	± 18	1.4	2.5	2 to 3	3 to 10	0.065	100	13	3	18	Low-Noise JFET-Input General-Purpose
TL072	± 3.5	± 18	1.4	2.5	2 to 3	3 to 10	0.065	100	13	3	18	Dual Low-Noise JFET-Input General-Purpose
TL074	± 3.5	± 18	1.4	2.5	2 to 3	3 to 10	0.065	100	13	3	18	Quad Low-Noise JFET-Input General-Purpose
TL081	± 3.5	± 18	1.4	2.8	2 to 3	3 to 15	0.03	86	13	3	18	JFET-Input General-Purpose
TL082	± 3.5	± 18	1.4	2.8	2 to 3	3 to 15	0.03	86	13	3	18	Dual JFET-Input General-Purpose
TL084	± 3.5	± 18	1.4	2.8	2 to 3	3 to 15	0.03	86	13	3	18	Quad JFET-Input General-Purpose
LinCMOS												
TLC1078	1.4	16	0.01	0.017	0.16	0.45	0.0006	95	0.032	0.085	68	Dual μ Power Precision Low-Voltage
TLC1079	1.4	16	0.01	0.017	0.19	0.85	0.0006	95	0.032	0.085	68	Quad μ Power Precision Low-Voltage
TLC251	1.4	16	0.675	1.6	0.39 to 1.1	2 to 10	0.0006	80	3.6	1.7	25	LinCMOS™ Programmable Low-Power
TLC252	1.4	16	0.7	1.6	0.29 to 1.1	2 to 10	0.0006	80	3.6	1.7	25	Dual Low-Voltage
TLC254	1.4	16	0.775	1.8	0.34 to 1.1	2 to 10	0.0006	80	3.6	1.7	25	Quad Low-Voltage
TLC25L2	1.4	16	0.01	0.017	0.204 to 1.1	2 to 10	0.0006	94	0.03	0.085	68	Dual μ Power Low-Voltage
TLC25L4	1.4	16	0.01	0.017	0.24 to 1.1	2 to 10	0.0006	94	0.03	0.085	70	Quad μ Power Low-Voltage
TLC25M2	1.4	16	0.105	0.28	0.22 to 1.1	2 to 10	0.0006	91	0.43	0.525	32	Dual Low-Power Low-Voltage
TLC25M4	1.4	16	0.105	0.28	0.25 to 1.1	2 to 10	0.0006	91	0.43	0.525	32	Quad Low-Power Low-Voltage
TLC271	3	16	0.675	1.6	0.34 to 1.1	2 to 10	0.0006	80	3.6	1.7	25	LinCMOS Programmable Low-Power
TLC272	3	16	0.7	1.6	0.23 to 1.1	2 to 10	0.0006	80	3.6	1.7	25	Dual Single Supply
TLC274	3	16	0.675	1.6	0.34 to 1.1	2 to 10	0.0006	80	3.6	1.7	25	Quad Single Supply
TLC277	3	16	0.7	1.6	0.2	0.5	0.0006	80	3.6	1.7	25	Dual Precision Single Supply
TLC279	3	16	0.675	1.6	0.32	0.9	0.0006	80	3.6	1.7	25	Quad Precision Single Supply
TLC27L1	3	16	0.01	0.017	0.24 to 1.1	2 to 10	0.0006	94	0.03	0.085	68	Single Precision Single Supply μ Power

General Purpose Op Amps (Continued)

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (mV)		I_{IB} (μ A)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max	typ	max						
LinCMOS (Continued)												
TLC27L2	3	16	0.01	0.017	0.9 to 1.1	5 to 10	0.0006	94	0.03	0.085	68	Dual Precision Single Supply μ Power
TLC27L4	3	16	0.01	0.017	0.24 to 1.1	2 to 10	0.0006	94	0.03	0.085	70	Quad Precision Single Supply μ Power
TLC27L7	3	16	0.01	0.017	0.17	0.5	0.0006	94	0.03	0.085	68	Dual Precision Single Supply μ Power
TLC27L9	3	16	0.01	0.017	0.2	0.9	0.0006	94	0.03	0.085	70	Quad Precision Single Supply μ Power
TLC27M2	3	16	0.105	0.28	0.22 to 1.1	2 to 10	0.0006	91	0.43	0.525	32	Dual Precision Single Supply Low-Power
TLC27M4	3	16	0.105	0.28	0.25 to 1.1	2 to 10	0.0006	91	0.43	0.525	32	Quad Precision Single Supply Low-Power
TLC27M7	3	16	0.105	0.28	0.185	0.5	0.0006	91	0.43	0.525	32	Dual Precision Single Supply Low-Power
TLC27M9	3	16	0.105	0.28	0.21	0.9	0.0006	91	0.43	0.525	32	Quad Precision Single Supply Low-Power
TLV2322	2	8	0.006	0.017	1.1	9	0.0006	88	0.02	0.027	68	Dual Low-Voltage μ Power
TLV2324	2	8	0.006	0.017	1.1	10	0.0006	88	0.02	0.027	68	Quad Low-Voltage μ Power
TLV2332	2	8	0.08	0.25	0.6	9	0.0006	92	0.38	0.3	32	Dual Low-Voltage Low-Power
TLV2334	2	8	0.08	0.25	0.6	10	0.0006	92	0.38	0.3	32	Quad Low-Voltage Low-Power
TLV2341	2	8	0.325	1.5	0.6	8	0.0006	78	2.1	0.79	25	Single LinCMOS Low-Voltage High-Speed
TLV2342	2	8	0.325	1.5	0.6	9	0.0006	78	2.1	0.79	25	Dual LinCMOS Low-Voltage High-Speed
TLV2344	2	8	0.325	1.5	1.1	10	0.0006	78	2.1	0.79	25	Quad LinCMOS Low-Voltage High-Speed

Performance Op Amps—Precision



† Devices released since January 1999 Designer's Guide

Performance Op Amps—Precision

Device	V_{IO} (μ V)		V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	typ	max	min	max	typ	max						
TLC2652	0.5 to 0.6	1 to 3	± 1.9	± 8	1.5	2.4	4	140	3.1	1.9	23	Precision Chopper-Stabilized
TLC2654	4 to 5	10 to 20	± 2.3	± 8	1.5	2.4	50	125	3.7	1.9	13	Low-Noise Chopper-Stabilized
TLE2027	10 to 20	25 to 100	± 4	± 22	3.8	5.3	15000	131	2.8	13	2.5	Low-Noise Precision
TLE2037	10 to 20	25 to 100	± 4	± 19	3.8	5.3	15000	131	7.5	50	2.5	Low-Noise High-Speed Precision Decomp
TLC4501*	10	40 to 80	4	6	1	1.5	1	100	2.5	4.7	12	Advanced LinEPIC Self-Calibrating (Self-Cal) Precision Single
TLC4502*	10	50 to 100	4	6	2.5	3.5	1	100	2.5	4.7	12	Advanced LinEPIC Self-Calibrating Precision Dual
TLE2022	70 to 150	150 to 500	± 2	± 20	0.275	0.35	35000	106	0.65	2.8	15	Dual Precision Low-Power Single Supply
TLC2201*	80 to 100	200 to 500	4.6	16	1	1.5	1	110	2.5	1.8	8	Low Noise Precision Rail-to-Rail Output
TLE2021	80 to 120	200 to 500	± 2	± 20	0.2	0.3	25000	115	0.65	2	15	Precision Low-Power Single Supply
LT1013	60 to 250	250 to 950	4	44	0.32	0.5	–15000	114	0.4		22	Dual Precision Low-Power
TLC2202*	80 to 100	500 to 1000	4.6	16	0.85	1.3	1	110	2.5	1.9	8	Dual Low-Noise Precision Rail-to- Rail
TLE2024		500 to 1000	± 2	± 20	0.2625	0.35	50000	102	0.7	2.8	15	Quad Precision Low-Power Single Supply
TLE2161	300 to 600	500 to 3000	± 3.5	± 19	0.29	0.35	4	90	10	6.4	40	JFET-Input High-Output-Drive Low- Power Decompensated
TLE2141	175 to 200	500 to 900	± 2	± 22	3.5	4.5	–700000	108	45	5.9	10.5	Low Noise High-Speed Precision Single Supply
TLE2142	275 to 290	750 to 1200	± 2	± 22	3.45	4.5	–700000	108	45	5.9	10.5	Dual Low-Noise High-Speed Precision
TLC2252*	200	850 to 1500	4.4	16	0.035	0.0625	1	83	0.12	0.2	19	Dual Rail-to-Rail μ Power
TLC2254*	200	850 to 1500	4.4	16	0.035	0.0625	1	83	0.12	0.2	19	Quad Rail-to-Rail μ Power
TLV2252*	200	850 to 1500	2.7	8	0.034	0.0625	1	75	0.1	0.187	19	Dual Rail-to-Rail Low-Voltage μ Power
TLV2254*	200	850 to 1500	2.7	8	0.034	0.0625	1	75	0.1	0.187	19	Quad Rail-to-Rail Low-Voltage μ Power
TLC2272*	300	950 to 2500	4.4	16	1.1	1.5	1	75	3.6	2.18	9	Dual Low-Noise Rail-to-Rail
TLC2274*	300	950 to 2500	4.4	16	1.1	1.5	1	75	3.6	2.18	9	Quad Low-Noise Rail-to-Rail

* Rail-to-rail output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Precision (Continued)

Performance Op Amps—Precision (Continued)

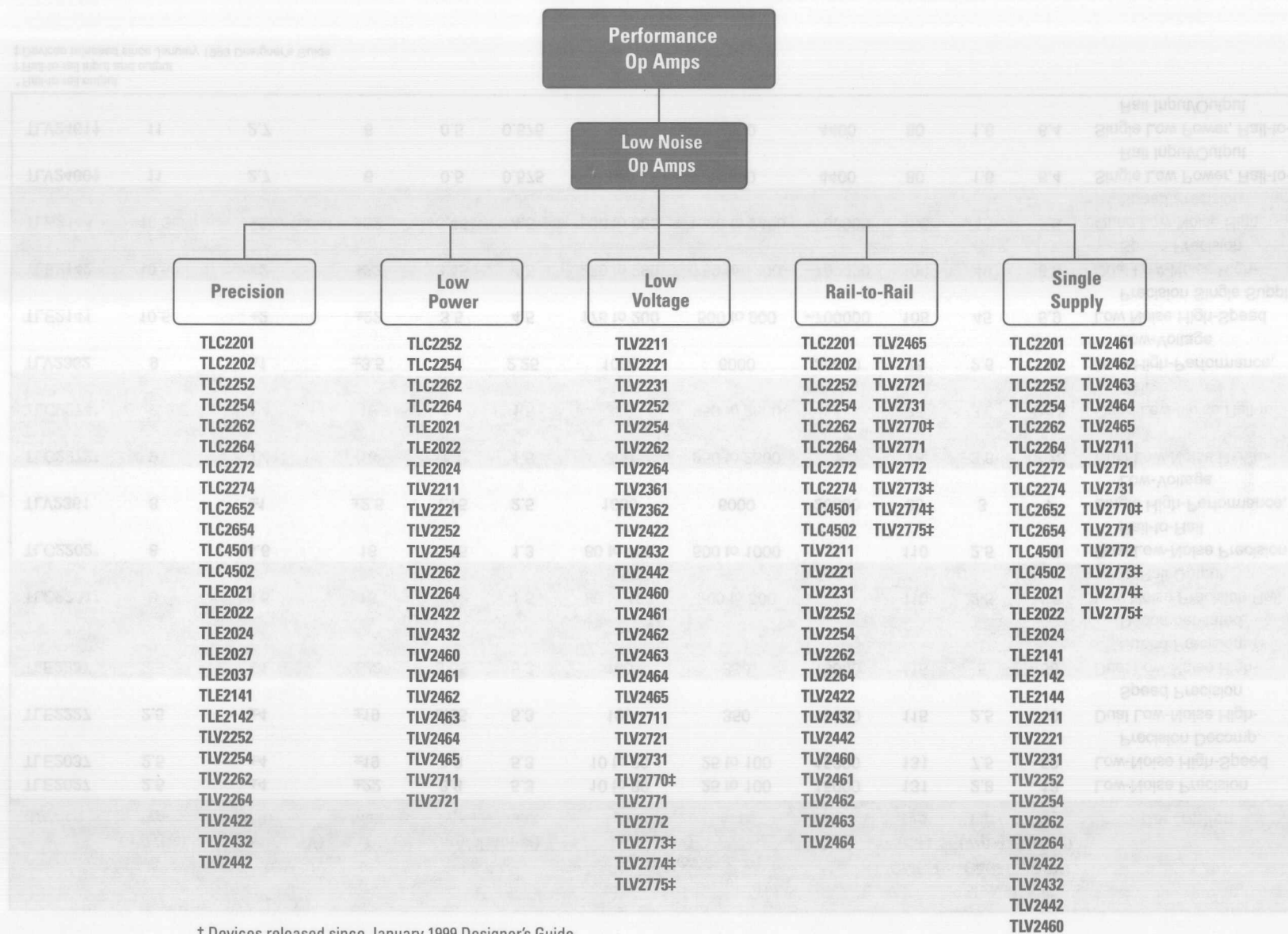
Device	typ	V_{IO}	V_{DD}/V_{CC}		I_{DD}/I_{CC}		I_B	CMRR	Slew Rate	GBW	V_n	Description
		(μV)	min	max	(mA/channel)	(pA)						
TLC2262*	300	950 to 2500	4.4	16	0.2	0.25	1	83	0.55	0.82	12	Dual Advanced LinCMOSTM Rail-to-Rail
TLC2264*	300	950 to 2500	4.4	16	0.2	0.25	1	83	0.55	0.82	12	Quad Advanced LinCMOS Rail-to-Rail
TLV2262*	300	950 to 2500	2.7	8	0.2	0.25	1	75	0.55	0.67	12	Dual Rail-to-Rail Low-Voltage Low-Power
TLV2264*	300	950 to 2500	2.7	8	0.2	0.25	1	75	0.55	0.67	12	Quad Rail-to-Rail Low-Voltage Low-Power
TLV2422*	300	950 to 2000	2.7	10	0.05	0.075	1	90	0.02	0.052	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2442*	300	950 to 2000	2.7	10	0.75	1.1	1	75	1.3	1.75	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2432*	300	950 to 2000	2.7	10	0.098	0.125	1	83	0.25	0.5	22	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2450†‡	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2451†‡	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2454†‡	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2455†‡	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Noise



† Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Noise

Device	V_n (nV/√Hz)	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μV)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/μs)	GBW (MHz)	Description
	typ	min	max	typ	max	typ	max	typ	typ	typ	typ	
TLE2027	2.5	±4	±22	3.8	5.3	10 to 20	25 to 100	15000	131	2.8	13	Low-Noise Precision
TLE2037	2.5	±4	±19	3.8	5.3	10 to 20	25 to 100	15000	131	7.5	50	Low-Noise High-Speed Precision Decomp.
TLE2227	2.5	±4	±19	3.65	5.3	100	350	15000	115	2.5	13	Dual Low-Noise High-Speed Precision
TLE2237	2.5	±4	±22	3.65	5.3	100	350	15000	115	5	50	Dual Low-Noise High-Speed Precision Decompensated
TLC2201*	8	4.6	16	1	1.5	80 to 100	200 to 500	1	110	2.5	1.8	Low Noise Precision Rail-to-Rail Output
TLC2202*	8	4.6	16	0.85	1.3	80 to 100	500 to 1000	1	110	2.5	1.9	Dual Low-Noise Precision Rail-to-Rail
TLV2361	8	±1	±2.5	1.75	2.5	1000	6000	20000	85	3	7	Single High-Performance, Low-Voltage
TLC2272*	9	4.4	16	1.1	1.5	300	950 to 2500	1	75	3.6	2.18	Dual Low-Noise Rail-to-Rail
TLC2274*	9	4.4	16	1.1	1.5	300	950 to 2500	1	75	3.6	2.18	Quad Low-Noise Rail-to-Rail
TLV2362	9	±1	±3.5	1.4	2.25	1000	6000	20000	75	2.5	6	Dual High-Performance, Low-Voltage
TLE2141	10.5	±2	±22	3.5	4.5	175 to 200	500 to 900	−700000	108	45	5.9	Low Noise High-Speed Precision Single Supply
TLE2142	10.5	±2	±22	3.45	4.5	275 to 290	750 to 1200	−700000	108	45	5.9	Dual Low-Noise High-Speed Precision
TLE2144	10.5	±2	±22	3.45	4.5	500 to 600	1500 to 2400	−700000	108	45	5.9	Quad Low-Noise High-Speed Precision
TLV2460†	11	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	Single Low Power, Rail-to-Rail Input/Output
TLV2461†	11	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	Single Low Power, Rail-to-Rail Input/Output

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Noise (Continued)

Device	V_n (nV/√Hz)	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μV)		I_B (pA)	CMRR (dB)	Slew Rate (V/μs)	GBW (MHz)	Description
	typ	min	max	typ	max	typ	max	typ	typ	typ	typ	
TLV2462†	11	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	Dual Low-Power, Rail-to-Rail Input/Output
TLV2463†	11	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	Dual Low-Power, Rail-to-Rail Input/Output
TLV2464†	11	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	Quad Low Power, Rail-to-Rail Input/Output
TLV2465†	11	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	Quad Low Power, Rail-to-Rail Input/Output
TLE2071	11.6	±2.25	±19	1.7	2.2	470 to 490	2000 to 4000	20	98	45	10	Low-Noise High-Speed JFET-Input
TLE2074	11.6	±2.25	±19	1.425	1.875	–1600 to –500	3000 to 5000	25	98	45	10	Quad Low-Noise High-Speed JFET-Input
TLE2081	11.6	±2.25	±19	1.7	2.2	470 to 490	3000 to 6000	20	98	45	10	High-Speed JFET-Input
TLE2072	11.6	±2.25	±19	1.55	1.8	700 to 1100	3500 to 6000	20	98	45	10	Dual Low-Noise High-Speed JFET-Input
TLE2082	11.6	±2.25	±19	1.55	1.8	700 to 1100	4000 to 7000	20	98	45	10	Dual High-Speed JFET-Input
TLE2084	11.6	±2.25	±19	1.625	1.875	–1600 to –500	4000 to 7000	25	98	45	10	Quad High-Speed JFET-Input
TLC4501*	12	4	6	1	1.5	10	40 to 80	1	100	2.5	4.7	Advanced LinEPIC Self-Calibrating (Self-Cal) Precision Single
TLC4502*	12	4	6	2.5	3.5	10	50 to 100	1	100	2.5	4.7	Advanced LinEPIC Self-Calibrating Precision Dual
TLC2262*	12	4.4	16	0.2	0.25	300	950 to 2500	1	83	0.55	0.82	Dual Advanced LinCMOS™ Rail-to-Rail
TLC2264*	12	4.4	16	0.2	0.25	300	950 to 2500	1	83	0.55	0.82	Quad Advanced LinCMOS Rail-to-Rail
TLV2262*	12	2.7	8	0.2	0.25	300	950 to 2500	1	75	0.55	0.67	Dual Rail-to-Rail Low-Voltage Low-Power

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Noise (Continued)

Device	V_n (nV/√Hz)	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μV)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/μs)	GBW (MHz)	Description
	typ	min	max	typ	max	typ	max	typ	typ	typ	typ	
TLV2264*	12	2.7	8	0.2	0.25	300	950 to 2500	1	75	0.55	0.67	Quad Rail-to-Rail Low-Voltage Low-Power
TLC2654	13	±2.3	±8	1.5	2.4	4 to 5	10 to 20	50	125	3.7	1.9	Low-Noise Chopper-Stabilized
TLE2022	15	±2	±20	0.275	0.35	70 to 150	150 to 500	35000	106	0.65	2.8	Dual Precision Low-Power Single Supply
TLE2021	15	±2	±20	0.2	0.3	80 to 120	200 to 500	25000	115	0.65	2	Precision Low-Power Single Supply
TLE2024	15	±2	±20	0.2625	0.35		500 to 1000	50000	102	0.7	2.8	Quad Precision Low-Power Single Supply
TLV2231*	15	2.7	10	0.85	1.2	710	3000	1	70	1.6	2	Single LinCMOS Rail-to-Rail μPower
TLV2731*	15	2.7	10	0.85	1.3	710	3000	1	70	1.6	2	Single LinCMOS Rail-to-Rail Low-Power
TLV2770‡	17	2.5	5.5	1	2	360	1600 to 2500	2	96	10.5	5.1	Single 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2771*	17	2.5	5.5	1	2	360	1600 to 2500	2	96	10.5	5.1	Single 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2772*	17	2.5	5.5	1	2	360	1600 to 2500	2	96	10.5	5.1	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2773‡	17	2.5	5.5	1	2	360	2100 to 2500	2	96	10.5	5.1	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2774‡	17	2.5	5.5	1	2	360	2100 to 2500	2	96	10.5	5.1	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2775‡	17	2.5	5.5	1	2	360	2100 to 2500	2	96	10.5	5.1	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2422*	18	2.7	10	0.05	0.075	300	950 to 2000	1	90	0.02	0.052	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Noise (Continued)

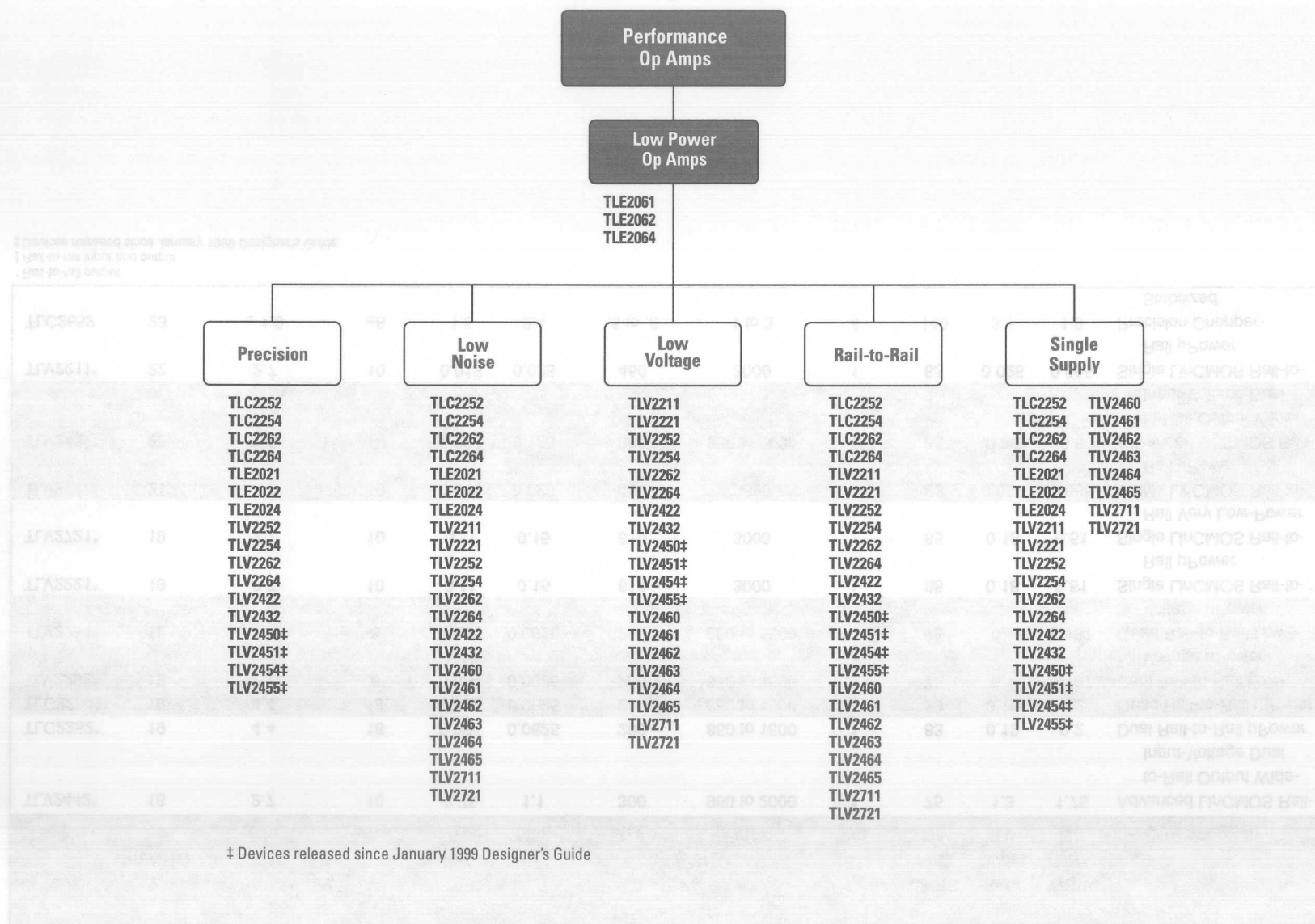
Device	V_n (nV/ $\sqrt{\text{Hz}}$)	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μV)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μs)	GBW (MHz)	Description
	typ	min	max	typ	max	typ	max	typ	typ	typ	typ	
TLV2442*	18	2.7	10	0.75	1.1	300	950 to 2000	1	75	1.3	1.75	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLC2252*	19	4.4	16	0.035	0.0625	200	850 to 1500	1	83	0.12	0.2	Dual Rail-to-Rail μPower
TLC2254*	19	4.4	16	0.035	0.0625	200	850 to 1500	1	83	0.12	0.2	Quad Rail-to-Rail μPower
TLV2252*	19	2.7	8	0.034	0.0625	200	850 to 1500	1	75	0.1	0.187	Dual Rail-to-Rail Low-Voltage μPower
TLV2254*	19	2.7	8	0.034	0.0625	200	850 to 1500	1	75	0.1	0.187	Quad Rail-to-Rail Low-Voltage μPower
TLV2221*	19	2.7	10	0.11	0.15	610	3000	1	85	0.18	0.51	Single LinCMOS Rail-to-Rail μPower
TLV2721*	19	2.7	10	0.11	0.15	610	3000	1	85	0.18	0.51	Single LinCMOS Rail-to-Rail Very Low-Power
TLV2711*	21	2.7	10	0.013	0.025	450	3000	1	83	0.025	0.065	Single LinCMOS Rail-to-Rail μPower
TLV2432*	22	2.7	10	0.098	0.125	300	950 to 2000	1	83	0.25	0.5	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2211*	22	2.7	10	0.013	0.025	450	3000	1	83	0.025	0.065	Single LinCMOS Rail-to-Rail μPower
TLC2652	23	± 1.9	± 8	1.5	2.4	.5 to .6	1 to 3	4	140	3.1	1.9	Precision Chopper-Stabilized

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Power



Performance Op Amps—Low Power

Device	I_{DD}/I_{CC} (mA/channel)		V_{DD}/V_{CC} (V)		V_{IO} (μ V)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	typ	max	min	max	typ	max						
TLV2711*	0.013	0.025	2.7	10	450	3000	1	83	0.025	0.065	21	Single LinCMOS Rail-to-Rail μ Power
TLV2211*	0.013	0.025	2.7	10	450	3000	1	83	0.025	0.065	22	Single LinCMOS Rail-to-Rail μ Power
TLV2450††	0.023	0.034	2.7	6	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2451††	0.023	0.034	2.7	6	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2454††	0.023	0.034	2.7	6	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2455††	0.023	0.034	2.7	6	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2252*	0.034	0.0625	2.7	8	200	850 to 1500	1	75	0.1	0.187	19	Dual Rail-to-Rail Low-Voltage μ Power
TLV2254*	0.034	0.0625	2.7	8	200	850 to 1500	1	75	0.1	0.187	19	Quad Rail-to-Rail Low-Voltage μ Power
TLC2252*	0.035	0.0625	4.4	16	200	850 to 1500	1	83	0.12	0.2	19	Dual Rail-to-Rail μ Power
TLC2254*	0.035	0.0625	4.4	16	200	850 to 1500	1	83	0.12	0.2	19	Quad Rail-to-Rail μ Power
TLV2422*	0.05	0.075	2.7	10	300	950 to 2000	1	90	0.02	0.052	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2432*	0.098	0.125	2.7	10	300	950 to 2000	1	83	0.25	0.5	22	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2221*	0.110	0.150	2.7	10	610	3000	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail μ Power
TLV2721*	0.110	0.150	2.7	10	610	3000	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail Very Low-Power
TLV2262*	0.2	0.25	2.7	8	300	950 to 2500	1	75	0.55	0.67	12	Dual Rail-to-Rail Low-Voltage Low-Power
TLV2264*	0.2	0.25	2.7	8	300	950 to 2500	1	75	0.55	0.67	12	Quad Rail-to-Rail Low-Voltage Low-Power
TLC2262*	0.2	0.25	4.4	16	300	950 to 2500	1	83	0.55	0.82	12	Dual Advanced LinCMOS Rail-to-Rail

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Power (Continued)

Performance Op Amps—Low Power (Continued)

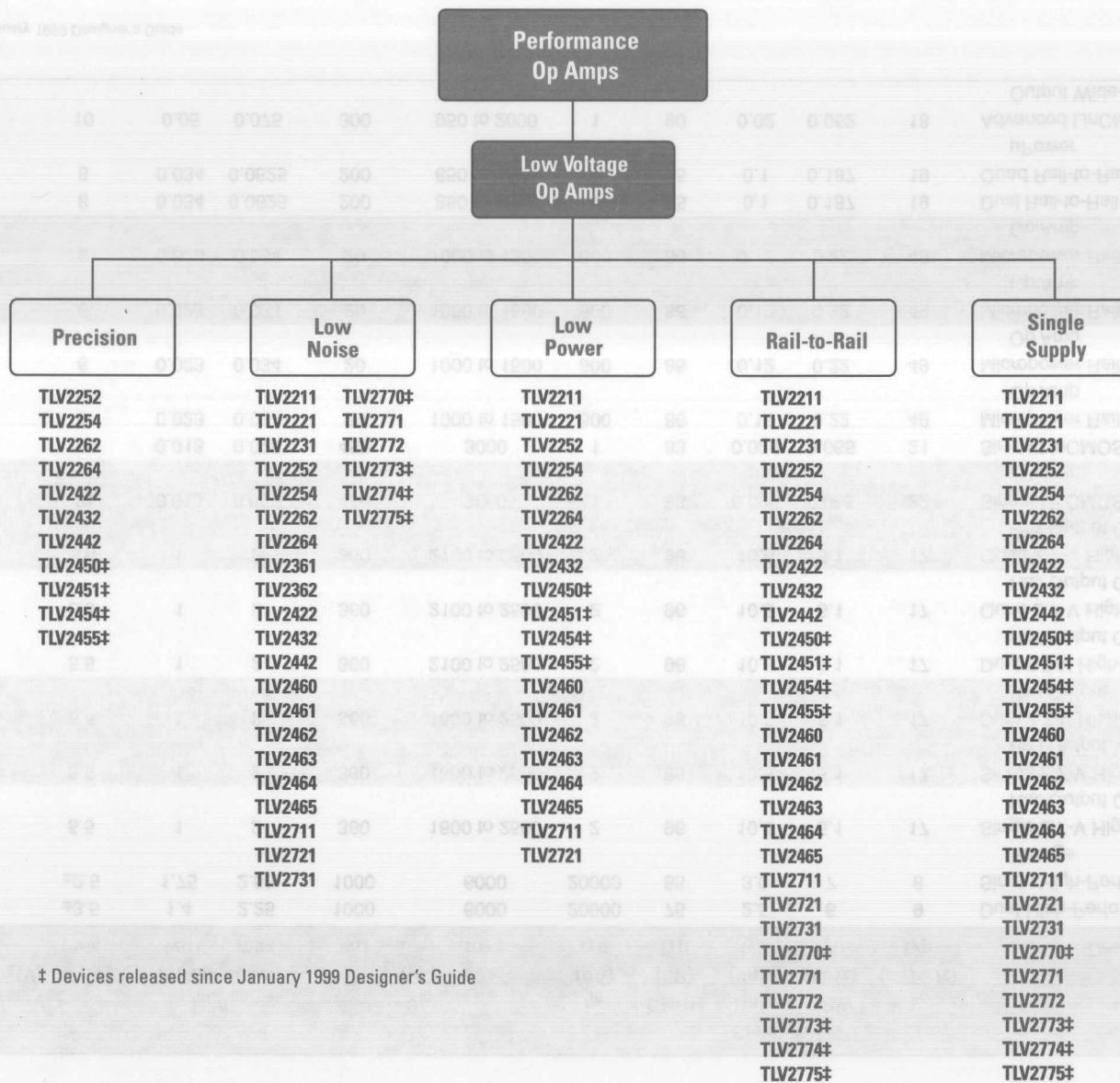
Device	I_{DD}/I_{CC} (mA/channel)		V_{DD}/V_{CC} (V)		V_{IO} (μ V)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	typ	max	min	max	typ	max						
TLC2264*	0.2	0.25	4.4	16	300	950 to 2500	1	83	0.55	0.82	12	Quad Advanced LinCMOS Rail-to-Rail
TLE2021	0.2	0.3	± 2	± 20	80 to 120	200 to 500	25000	115	0.65	2	15	Precision Low-Power Single Supply
TLE2024	0.2625	0.35	± 2	± 20		500 to 1000	50000	102	0.7	2.8	15	Quad Precision Low-Power Single Supply
TLE2022	0.275	0.35	± 2	± 20	70 to 150	150 to 500	35000	106	0.65	2.8	15	Dual Precision Low-Power Single Supply
TLE2061	0.29	0.35	± 3.5	± 19	300 to 600	500 to 3000	4	90	3.4	2	40	JFET-Input High-Output-Drive μ Power
TLE2062	0.3125	0.345	± 3.5	± 19	500 to 900	1000 to 4000	4	90	3.4	2	40	Dual JFET-Input High-Output-Drive μ Power
TLE2064	0.3125	0.35	± 3.5	± 19	700 to 900	2000 to 6000	4	90	3.4	2	40	Quad JFET-Input High-Output-Drive μ Power
TLV2460†	0.5	0.575	2.7	6	100	2000	4400	80	1.6	6.4	11	Single Low Power, Rail-to-Rail Input/Output
TLV2461†	0.5	0.575	2.7	6	100	2000	4400	80	1.6	6.4	11	Single Low Power, Rail-to-Rail Input/Output
TLV2462†	0.5	0.575	2.7	6	100	2000	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2463†	0.5	0.575	2.7	6	100	2000	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2464†	0.5	0.575	2.7	6	100	2000	4400	80	1.6	6.4	11	Quad Low Power, Rail-to-Rail Input/Output
TLV2465†	0.5	0.575	2.7	6	100	2000	4400	80	1.6	6.4	11	Quad Low Power, Rail-to-Rail Input/Output

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Voltage



† Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Voltage

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		typ	V_{IO} (μ V)	max	I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max									
TLV2362	± 1	± 3.5	1.4	2.25	1000		6000	20000	75	2.5	6	9	Dual High-Performance, Low-Voltage
TLV2361	± 1	± 2.5	1.75	2.50	1000		6000	20000	85	3.0	7	8	Single High-Performance, Low-Voltage
TLV2770*†	2.5	5.5	1	2	360		1600 to 2500	2	96	10.5	5.1	17	Single 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2771*	2.5	5.5	1	2	360		1600 to 2500	2	96	10.5	5.1	17	Single 2.7-V High-Slew-Rate Rail-to-Rail Output
TLV2772*	2.5	5.5	1	2	360		1600 to 2500	2	96	10.5	5.1	17	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output
TLV2773*†	2.5	5.5	1	2	360		2100 to 2500	2	96	10.5	5.1	17	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2774*†	2.5	5.5	1	2	360		2100 to 2500	2	96	10.5	5.1	17	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2775*†	2.5	5.5	1	2	360		2100 to 2500	2	96	10.5	5.1	17	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2211*	2.7	10	0.013	0.025	450		3000	1	83	0.025	0.065	22	Single LinCMOS Rail-to-Rail μ Power
TLV2711*	2.7	10	0.013	0.025	450		3000	1	83	0.025	0.065	21	Single LinCMOS Rail-to-Rail μ Power
TLV2450††	2.7	6	0.023	0.034	20		1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2451††	2.7	6	0.023	0.034	20		1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2454††	2.7	6	0.023	0.034	20		1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2455††	2.7	6	0.023	0.034	20		1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2252*	2.7	8	0.034	0.0625	200		850 to 1500	1	75	0.1	0.187	19	Dual Rail-to-Rail Low-Voltage μ Power
TLV2254*	2.7	8	0.034	0.0625	200		850 to 1500	1	75	0.1	0.187	19	Quad Rail-to-Rail Low-Voltage μ Power
TLV2422*	2.7	10	0.05	0.075	300		950 to 2000	1	90	0.02	0.052	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual

* Rail-to-rail output

† Rail-to-rail input and output

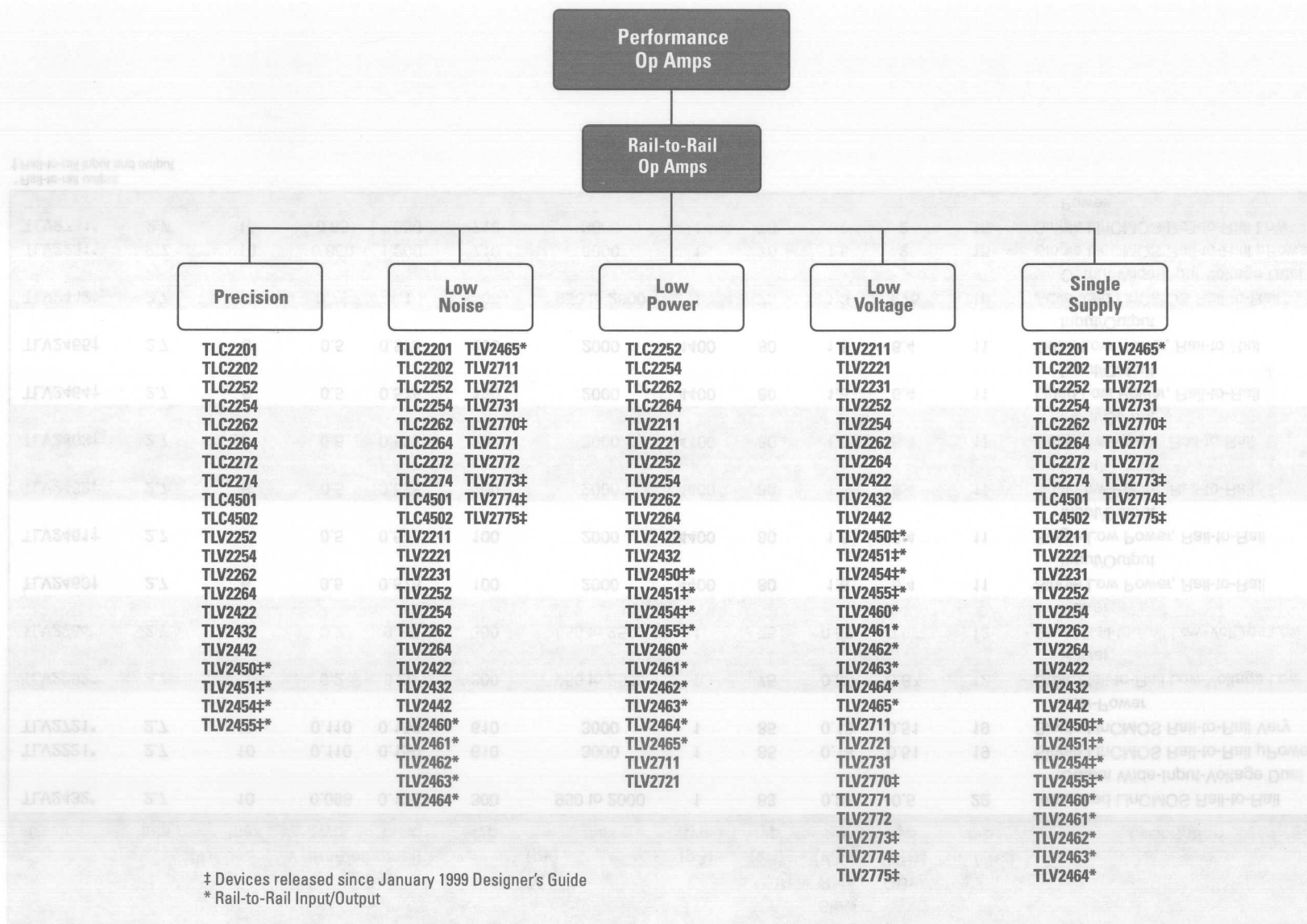
‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Low Voltage (Continued)

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μ V)	I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt Hz)	Description	
	min	max	typ	max								typ
TLV2432*	2.7	10	0.098	0.125	300	950 to 2000	1	83	0.25	0.5	22	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2221*	2.7	10	0.110	0.150	610	3000	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail μ Power
TLV2721*	2.7	10	0.110	0.150	610	3000	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail Very Low-Power
TLV2262*	2.7	8	0.2	0.25	300	950 to 2500	1	75	0.55	0.67	12	Dual Rail-to-Rail Low-Voltage Low Power
TLV2264*	2.7	8	0.2	0.25	300	950 to 2500	1	75	0.55	0.67	12	Quad Rail-to-Rail Low-Voltage Low Power
TLV2460†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Single Low Power, Rail-to-Rail Input/Output
TLV2461†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Single Low Power, Rail-to-Rail Input/Output
TLV2462†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2463†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2464†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Quad Low Power, Rail-to-Rail Input/Output
TLV2465†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Quad Low Power, Rail-to-Rail Input/Output
TLV2442*	2.7	10	0.75	1.1	300	950 to 2000	1	75	1.3	1.75	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2231*	2.7	10	0.850	1.200	710	3000	1	70	1.6	2	15	Single LinCMOS Rail-to-Rail μ Power
TLV2731*	2.7	10	0.85	1.300	710	3000	1	70	1.6	2	15	Single LinCMOS Rail-to-Rail Low-Power

* Rail-to-rail output
† Rail-to-rail input and output

Performance Op Amps—Rail-to-Rail



Performance Op Amps—Rail-to-Rail

Device	typ	V_{IO} (μ V)	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		I_{IB} (pA)	$CMRR$ (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
		max	min	max	typ	max	typ	typ	typ	typ	typ	
TLV2770*†	360	1600 to 2500	2.5	5.5	1	2	2	96	10.5	5.1	17	Single 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2771*	360	1600 to 2500	2.5	5.5	1	2	2	96	10.5	5.1	17	Single 2.7-V High-Slew-Rate Rail-to-Rail Output
TLV2772*	360	1600 to 2500	2.5	5.5	1	2	2	96	10.5	5.1	17	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output
TLV2773*†	360	2100 to 2500	2.5	5.5	1	2	2	96	10.5	5.1	17	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2774*†	360	2100 to 2500	2.5	5.5	1	2	2	96	10.5	5.1	17	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2775*†	360	2100 to 2500	2.5	5.5	1	2	2	96	10.5	5.1	17	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2211*	450	3000	2.7	10	0.013	0.025	1	83	0.025	0.065	22	Single LinCMOS Rail-to-Rail μ Power
TLV2711*	450	3000	2.7	10	0.013	0.025	1	83	0.025	0.065	21	Single LinCMOS Rail-to-Rail μ Power
TLV2450††	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2451††	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2454††	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2455††	20	1000 to 1500	2.7	6	0.023	0.034	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2252*	200	850 to 1500	2.7	8	0.034	0.0625	1	75	0.1	0.187	19	Dual Rail-to-Rail Low-Voltage μ Power
TLV2254*	200	850 to 1500	2.7	8	0.034	0.0625	1	75	0.1	0.187	19	Quad Rail-to-Rail Low-Voltage μ Power
TLV2422*	300	950 to 2000	2.7	10	0.05	0.075	1	90	0.02	0.052	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2432*	300	950 to 2000	2.7	10	0.098	0.125	1	83	0.25	0.5	22	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2221*	610	3000	2.7	10	0.110	0.150	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail μ Power
TLV2721*	610	3000	2.7	10	0.110	0.150	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail Very Low-Power
TLV2262*	300	950 to 2500	2.7	8	0.2	0.25	1	75	0.55	0.67	12	Dual Rail-to-Rail Low-Voltage Low-Power

* Rail-to-rail output

† Rail-to-rail input and output

†† Devices released since January 1999 Designer's Guide

Performance Op Amps—Rail-to-Rail (Continued)

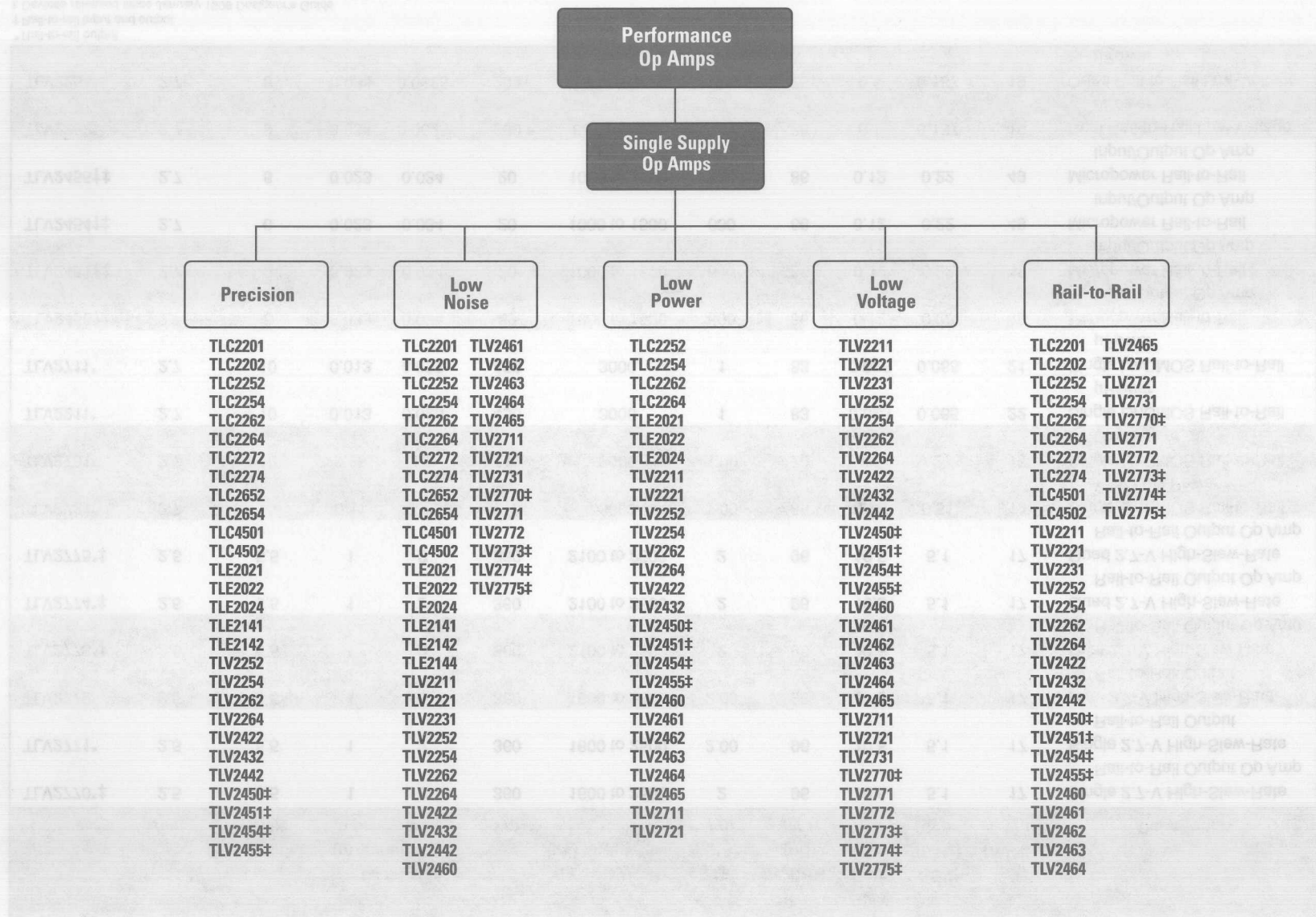
Performance Op Amps—Rail-to-Rail (Continued)

Device	typ	V_{IO} (μV)	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		I_{IB} (pA)	$CMRR$ (dB)	Slew Rate (V/ μs)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
		max	min	max	typ	max	typ	typ	typ	typ	typ	
TLV2264*	300	950 to 2500	2.7	8	0.2	0.25	1	75	0.55	0.67	12	Quad Rail-to-Rail Low-Voltage Low-Power
TLV2460†	100	2000	2.7	6	0.5	0.575	4400	80	1.6	6.4	11	Single Low-Power, Rail-to-Rail Input/Output
TLV2461†	100	2000	2.7	6	0.5	0.575	4400	80	1.6	6.4	11	Single Low-Power, Rail-to-Rail Input/Output
TLV2462†	100	2000	2.7	6	0.5	0.575	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2463†	100	2000	2.7	6	0.5	0.575	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2464†	100	2000	2.7	6	0.5	0.575	4400	80	1.6	6.4	11	Quad Low-Power, Rail-to-Rail Input/Output
TLV2465†	100	2000	2.7	6	0.5	0.575	4400	80	1.6	6.4	11	Quad Low-Power, Rail-to-Rail Input/Output
TLV2442*	300	950 to 2000	2.7	10	0.75	1.1	1	75	1.3	1.75	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2231*	710	3000	2.7	10	0.850	1.200	1	70	1.6	2	15	Single LinCMOS Rail-to-Rail μ Power
TLV2731*	710	3000	2.7	10	0.85	1.300	1	70	1.6	2	15	Single LinCMOS Rail-to-Rail Low-Power
TLC4501*	10	40 to 80	4	6	1	1.5	1	100	2.5	4.7	12	Advanced LinEPIC Self-Calibrating (Self- Cal) Precision Single
TLC4502*	10	50 to 100	4	6	2.5	3.5	1	100	2.5	4.7	12	Advanced LinEPIC Self-Calibrating Precision Dual
TLC2252*	200	850 to 1500	4.4	16	0.035	0.0625	1	83	0.12	0.2	19	Dual Rail-to-Rail μ Power
TLC2254*	200	850 to 1500	4.4	16	0.035	0.0625	1	83	0.12	0.2	19	Quad Rail-to-Rail μ Power
TLC2262*	300	950 to 2500	4.4	16	0.2	0.25	1	83	0.55	0.82	12	Dual Advanced LinCMOS Rail-to-Rail
TLC2264*	300	950 to 2500	4.4	16	0.2	0.25	1	83	0.55	0.82	12	Quad Advanced LinCMOS Rail-to-Rail
TLC2272*	300	950 to 2500	4.4	16	1.1	1.5	1	75	3.6	2.18	9	Dual Low-Noise Rail-to-Rail
TLC2274*	300	950 to 2500	4.4	16	1.1	1.5	1	75	3.6	2.18	9	Quad Low-Noise Rail-to-Rail
TLC2202*	80 to 100	500 to 1000	4.6	16	0.85	1.3	1	110	2.5	1.9	8	Dual Low-Noise Precision Rail-to-Rail
TLC2201*	80 to 100	200 to 500	4.6	16	1	1.5	1	110	2.5	1.8	8	Low Noise Precision Rail-to-Rail Output

* Rail-to-rail output

† Rail-to-rail input and output

Performance Op Amps—Single-Supply



† Devices released since January 1999 Designer's Guide

Performance Op Amps—Single-Supply

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μ V)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max	typ	max						
TLV2770*‡	2.5	5.5	1	2	360	1600 to 2500	2	96	10.5	5.1	17	Single 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2771*	2.5	5.5	1	2	360	1600 to 2500	2.00	96	10.5	5.1	17	Single 2.7-V High-Slew-Rate Rail-to-Rail Output
TLV2772*	2.5	5.5	1	2	360	1600 to 2500	2.00	96	10.5	5.1	17	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output
TLV2773*‡	2.5	5.5	1	2	360	2100 to 2500	2	96	10.5	5.1	17	Dual 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2774*‡	2.5	5.5	1	2	360	2100 to 2500	2	96	10.5	5.1	17	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2775*‡	2.5	5.5	1	2	360	2100 to 2500	2	96	10.5	5.1	17	Quad 2.7-V High-Slew-Rate Rail-to-Rail Output Op Amp
TLV2721*	2.7	10	0.11	0.15	610	3000	1.00	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail Very Low-Power
TLV2731*	2.7	10	0.85	1.3	710	3000	1.00	70	1.6	2	15	Single LinCMOS Rail-to-Rail Low-Power
TLV2211*	2.7	10	0.013	0.025	450	3000	1	83	0.025	0.065	22	Single LinCMOS Rail-to-Rail μ Power
TLV2711*	2.7	10	0.013	0.025	450	3000	1	83	0.025	0.065	21	Single LinCMOS Rail-to-Rail μ Power
TLV2450†‡	2.7	6	0.023	0.034	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2451†‡	2.7	6	0.023	0.034	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2454†‡	2.7	6	0.023	0.034	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2455†‡	2.7	6	0.023	0.034	20	1000 to 1500	600	86	0.12	0.22	49	Micropower Rail-to-Rail Input/Output Op Amp
TLV2252*	2.7	8	0.034	0.0625	200	850 to 1500	1	75	0.1	0.187	19	Dual Rail-to-Rail Low-Voltage μ Power
TLV2254*	2.7	8	0.034	0.0625	200	850 to 1500	1	75	0.1	0.187	19	Quad Rail-to-Rail Low-Voltage μ Power

* Rail-to-rail output

† Rail-to-rail input and output

‡ Devices released since January 1999 Designer's Guide

Performance Op Amps—Single-Supply (Continued)

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μ V)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max	typ	max						
TLV2422*	2.7	10	0.05	0.075	300	950 to 2000	1	90	0.02	0.052	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2432*	2.7	10	0.098	0.125	300	950 to 2000	1	83	0.25	0.5	22	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2221*	2.7	10	0.110	0.150	610	3000	1	85	0.18	0.51	19	Single LinCMOS Rail-to-Rail μ Power
TLV2262*	2.7	8	0.2	0.25	300	950 to 2500	1	75	0.55	0.67	12	Dual Rail-to-Rail Low-Voltage Low-Power
TLV2264*	2.7	8	0.2	0.25	300	950 to 2500	1	75	0.55	0.67	12	Quad Rail-to-Rail Low-Voltage Low-Power
TLV2460†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Single Low-Power, Rail-to-Rail Input/Output
TLV2461†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Single Low-Power, Rail-to-Rail Input/Output
TLV2462†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2463†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Dual Low-Power, Rail-to-Rail Input/Output
TLV2464†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Quad Low-Power, Rail-to-Rail Input/Output
TLV2465†	2.7	6	0.5	0.575	100	2000	4400	80	1.6	6.4	11	Quad Low-Power, Rail-to-Rail Input/Output
TLV2442*	2.7	10	0.75	1.1	300	950 to 2000	1	75	1.3	1.75	18	Advanced LinCMOS Rail-to-Rail Output Wide-Input-Voltage Dual
TLV2231*	2.7	10	0.850	1.200	710	3000	1	70	1.6	2	15	Single LinCMOS Rail-to-Rail μ Power
TLC2652	3.8	16	1.5	2.4	0.5 to 0.6	1 to 3	4	140	3.1	1.9	23	Precision Chopper-Stabilized
TLE2021	4	40	0.2	0.3	80 to 120	200 to 500	25000	115	0.65	2	15	Precision Low-Power Single Supply

* Rail-to-rail output
† Rail-to-rail input and output

Performance Op Amps—Single-Supply (Continued)

Performance Op Amps—Single-Supply (Continued)

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/channel)		V_{IO} (μ V)		I_{IB} (pA)	CMRR (dB)	Slew Rate (V/ μ s)	GBW (MHz)	V_n (nV/ \sqrt{Hz})	Description
	min	max	typ	max	typ	max						
TLE2022	4	40	0.275	0.35	70 to 150	150 to 500	35000	106	0.65	2.8	15	Dual Precision Low-Power Single Supply
TLE2024	4	40	0.2625	0.35		500 to 1000	50000	102	0.7	2.8	15	Quad Precision Low-Power Single Supply
TLC4501*	4	6	1	1.5	10	40 to 80	1	100	2.5	4.7	12	Advanced LinEPIC Self- Calibrating (Self-Cal) Precision Single
TLC4502*	4	6	2.5	3.5	10	50 to 100	1	100	2.5	4.7	12	Advanced LinEPIC Self- Calibrating Precision Dual
TLE2141	4	44	3.5	4.5	175 to 200	500 to 900	-700000	108	45	5.9	10.5	Low Noise High-Speed Precision Single Supply
TLE2142	4	44	3.45	4.5	275 to 290	750 to 1200	-700000	108	45	5.9	10.5	Dual Low-Noise High-Speed Precision
TLE2144	4	44	3.45	4.5	500 to 600	1500 to 2400	-700000	108	45	5.9	10.5	Quad Low-Noise High-Speed Precision
TLC2252*	4.4	16	0.035	0.0625	200	850 to 1500	1	83	0.12	0.2	19	Dual Rail-to-Rail μ Power
TLC2254*	4.4	16	0.035	0.0625	200	850 to 1500	1	83	0.12	0.2	19	Quad Rail-to-Rail μ Power
TLC2262*	4.4	16	0.2	0.25	300	950 to 2500	1	83	0.55	0.82	12	Dual Advanced LinCMOS Rail- to-Rail
TLC2264*	4.4	16	0.2	0.25	300	950 to 2500	1	83	0.55	0.82	12	Quad Advanced LinCMOS Rail- to-Rail
TLC2272*	4.4	16	1.1	1.5	300	950 to 2500	1	75	3.6	2.18	9	Dual Low-Noise Rail-to-Rail
TLC2274*	4.4	16	1.1	1.5	300	950 to 2500	1	75	3.6	2.18	9	Quad Low-Noise Rail-to-Rail
TLC2654	4.6	16	1.5	2.4	4 to 5	10 to 20	50	125	3.7	1.9	13	Low-Noise Chopper-Stabilized
TLC2202*	4.6	16	0.85	1.3	80 to 100	500 to 1000	1	110	2.5	1.9	8	Dual Low-Noise Precision Rail- to-Rail
TLC2201*	4.6	16	1	1.5	80 to 100	200 to 500	1	110	2.5	1.8	8	Low Noise Precision Rail-to- Rail Output

* Rail-to-rail output

† Rail-to-rail input and output

Audio Power Amplifiers



TPA0102
TPA0103
TPA0112†
TPA0132†
TPA0202
TPA102
TPA112
TPA122
TPA1517
TPA152
TPA301
TPA302
TPA311
TPA4860
TPA4861
TPA701
TPA711
TPA721

TPA005D02

† Devices released since January 1999 Designer's Guide

Part Number	Supply Voltage (V)	Power (W)	THD (%)	Frequency (kHz)	Package	Operating Temperature (°C)	Notes
TPA005D02	5	0.5	10	20	SOIC-8	-40 to 85	Class-D audio power amplifier
TPA0102	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA0103	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA0112†	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA0132†	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA0202	5	2	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA102	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA112	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA122	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA1517	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA152	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA301	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA302	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA311	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA4860	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA4861	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA701	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA711	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier
TPA721	5	1	10	20	SOIC-8	-40 to 85	Class-AB audio power amplifier

Audio Power Amplifiers

Device	P _{O(RMS)} (W) typ	THD+N (%) typ	V _{CC} /V _{DD} (V)		I _{CC} /I _{DD} per channel (mA) typ	PSRR @ 1 kHz (dB) typ	Shutdown Control (μA) typ	Package	Description
Class-AB (Linear)									
TPA152	0.075	0.021	4.5	5.5	3.00	81	N/A	8-pin SOIC	Stereo Audio Power Amplifier
TPA102	0.15	0.05	2.5	5.5	0.75	76	10	8-pin MSOP*	Stereo Audio Power Amplifier
TPA112	0.15	0.05	2.5	5.5	0.75	76	N/A	8-pin SOIC/MSOP*	Stereo Audio Power Amplifier
TPA122	0.15	0.05	2.5	5.5	0.75	76	10	8-pin SOIC/MSOP*	Stereo Audio Power Amplifier
TPA302	0.3	0.08	2.7	5.5	2.00	65	0.6	8-pin SOIC**	Stereo Audio Power Amplifier
TPA301	0.35	0.3	2.5	5.5	0.70	78	0.15	8-pin SOIC/MSOP*	Mono Audio Power Amplifier
TPA311	0.35	0.3	2.5	5.5	0.70	78	7	8-pin SOIC/MSOP*	Mono Audio Power Amplifier
TPA701	0.7	0.2	2.5	5.5	1.25	78	0.0015	8-pin SOIC/MSOP*	Mono Audio Power Amplifier
TPA711	0.7	0.2	2.5	5.5	1.25	78	7	8-pin SOIC/MSOP*	Mono Audio Power Amplifier
TPA721	0.7	0.2	2.5	5.5	1.25	78	7	8-pin SOIC/MSOP*	Mono Audio Power Amplifier
TPA4860	1	0.3	2.7	5.5	3.50	75	0.6	16-pin SOIC	Mono Audio Power Amplifier
TPA4861	1	0.3	2.7	5.5	3.50	75	0.6	8-pin SOIC**	Mono Audio Power Amplifier
TPA0102	1.5	0.05	3	5.5	10.00	75	5	24-pin TSSOP*	Stereo Audio Power Amplifier
TPA0103	1.75	0.05	3	5.5	10.00	75	5	24-pin TSSOP*	3-Channel Stereo Audio Power Amplifier
TPA0112‡	2	0.75	4.5	5.5	3.00	77	150	24-pin TSSOP*	Stereo Audio Power Amplifier
TPA0132‡	2	0.04	4.5	5.5	5.00	67	150	24-pin TSSOP*	Stereo Audio Power Amplifier
TPA0202	2	0.05	3	5.5	10.00	75	5	24-pin TSSOP*	Stereo Audio Power Amplifier
TPA1517	6, 4.5	10, 0.2	9.5	18	20.00	65	7	20-pin SOIC*/DIP**	Stereo Audio Power Amplifier
Class-D									
TPA005D02	2	0.4	4.5	5.5	12.00	40	400	48-pin TSSOP*	Stereo Class-D Audio Power Amplifier

* PowerPAD package

** Thermally enhanced package

‡ Devices released since January 1999 Designer's Guide

High-Speed Amplifiers

High-Speed Amplifiers

xDSL High-Speed Drivers/Receivers

THS6002
THS6012
THS6022†
THS6062†
THS7002†

Current/Voltage Feedback High-Speed Amplifiers

THS3001
THS4001
THS4031†
THS4032†
THS4061†
THS4062†

† Devices released since January 1999 Designer's Guide

xDSL High-Speed Drivers/Receivers

† Devices released since January 1999 Designer's Guide

Part Number	Supply Voltage (V)	Input Voltage Range (V)	Input Current (nA)	Output Current (mA)	Common-Mode Input Range (V)	Common-Mode Output Range (V)	Gain Bandwidth Product (MHz)	slew rate (V/μs)	settling time (ns)	settling time (ns)	Typical Applications
THS6002	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS6012	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS6022†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS6062†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS7002†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS4001	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS4031†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS4032†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS4061†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver
THS4062†	5	0.5	10	100	0.5	0.5	100	100	10	10	100-MHz 100-ns high-speed voltage driver

Current/Voltage Feedback High-Speed Amplifiers

Current/Voltage Feedback High-Speed Amplifiers

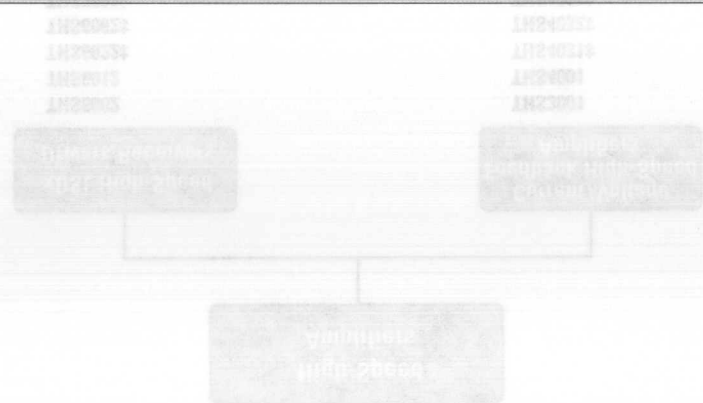
Device	5 V	V _{CC} /V _{DD} ±5 V	±15 V	A _{CL} min	BW @ A _{CL} (MHz) typ	Slew Rate (V/μs) typ	I _O (mA) typ	THD F _c = 1 MHz (dB) typ	V _n (nV/√Hz) typ	Diff Gain (%) typ	Diff Phase (°) typ	Description
THS3001		✓	✓	1	420	6500	120	-96	1.6	0.01	0.02	420-MHz Current Feedback Amplifier
THS4001	✓	✓	✓	1	270	400	100	-72	12.5	0.01	0.08	270-MHz Voltage Feedback Amplifier
THS4031†		✓	✓	2	100	100	90	-81	1.6	0.02	0.03	Low-Noise High-Speed Amplifier
THS4032†		✓	✓	2	100	100	90	-81	1.6	0.02	0.03	Low-Noise Dual High-Speed Amplifiers
THS4061†		✓	✓	1	180	400	115	-72	14.5	0.02	0.02	180-MHz High-Speed Amplifier
THS4062†		✓	✓	1	180	400	115	-72	14.5	0.02	0.02	180-MHz Dual High-Speed Amplifiers

† Devices released since January 1999 Designer's Guide

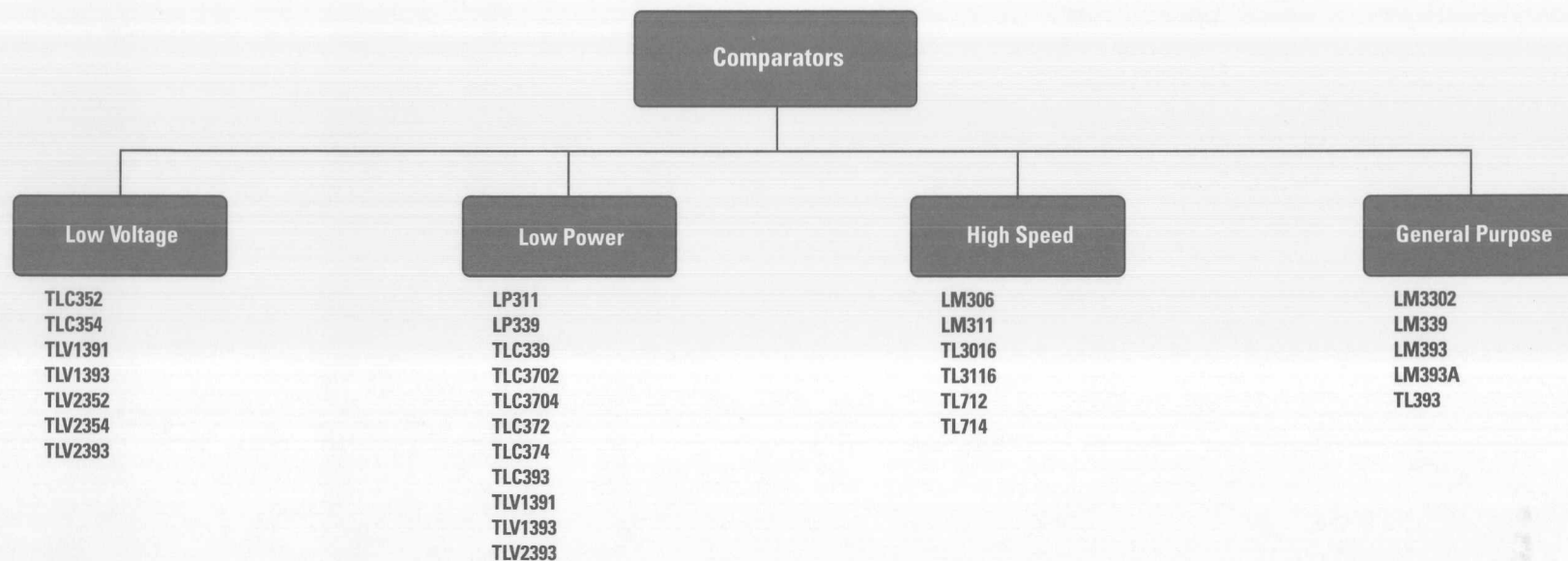
xDSL High-Speed Drivers/Receivers

Device	±5 V	V _{CC} /V _{DD} ±15 V	BW (MHz) typ	Slew Rate (V/μs) typ	V _n (nV/√Hz) typ	THD F _c = 1 MHz (dB) typ	I _O (mA) typ	Description
THS6002	✓	✓	140	1000	1.7	-62	500	Dual Differential Line Drivers and Receivers
THS6012	✓	✓	140	1300	1.7	-65	500	500-mA Dual Differential Line Driver
THS6022†	✓	✓	210	1900	1.7	-66	250	250-mA Dual High-Speed Amplifiers
THS6062†	✓	✓	100	100	1.6	-72	90	Low-Noise ADSL Differential Receiver
THS7002†	✓	✓	75	175	1.7	-69	50	75-MHz Dual Programmable-Gain Amplifiers

† Devices released since January 1999 Designer's Guide



Comparators



TLA3302	5	1	0.02	0.42	2	0	18	1	Quad Low-Voltage Differential Comparators
TLA1381	5	1	0.750	0.02	2	0	28	0.8	Single Differential Comparators
TLA3324	5	8	0.452	0.5	2	0	5	6	Quad Low-Voltage PUSCROS Differential Comparators
TLA325	5	8	0.15	0.5	2	0	2	6	Quad Low-Voltage PUSCROS Differential Comparators
TLA1203	2	1	0.15	0.5	2	0	18	0.8	Single Low-Voltage PUSCROS Differential Comparators
TLA324	14	18	0.12	0.5	2	0	4	6	Quad Low-Voltage PUSCROS Differential Comparators
TLA325	14	18	0.12	0.5	2	0	4	6	Quad Low-Voltage PUSCROS Differential Comparators

Low Voltage Comparators

Low Voltage Comparators

Device	V_{DD}/V_{CC} (V)		I_{DD}/I_{CC} (mA/ch) max	t_{resp} Low-High (μ s) typ	V_{IO} (mV) max	V_{ICR} (V)		I_{OL} (mA) min	Description
	min	max				min	max		
TLC352	1.4	16	0.15	0.2	5	0	4	6	Dual, Low-Voltage, LinCMOS™ Differential Comparator
TLC354	1.4	16	0.15	0.2	5	0	4	6	Quad, Low-Voltage, LinCMOS Differential Comparator
TLV1393	2	7	0.125	0.7	5	0	1.8	0.5	Dual Low-Voltage, Low-Power Differential Comparator
TLV2352	2	8	0.125	0.2	5	0	2	6	Dual Low-Voltage LinCMOS Differential Comparator
TLV2354	2	8	0.125	0.2	5	0	2	6	Quad Low-Voltage LinCMOS Differential Comparator
TLV1391	2	7	0.150	0.65	5	0	3.8	0.6	Single Differential Comparator
TLV2393	2	7	0.65	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator

Low Power Comparators

Device	I_{DD}/I_{CC} (mA/ch) max	V_{DD}/V_{CC} (V)		t_{resp} Low-High (μ s) typ	V_{IO} (mV) max	V_{ICR} (V)		I_{OL} (mA) min	Description
		min	max			min	max		
TLC339	0.02	3	16	1	5	0	4	6	Quad, μ Power, LinCMOS Comparator
TLC3702	0.02	3	16	1.1	5	0	4	4	Dual, μ Power, Push-Pull Outputs, LinCMOS Voltage Comparator
TLC3704	0.02	3	16	1.1	5	0	4	4	Quad, μ Power, Push-Pull Outputs, LinCMOS Voltage Comparator
TLC393	0.02	3	16	1.1	5	0	4	6	Dual, μ Power, LinCMOS Voltage Comparator
LP339	0.025	4	30	1.3	5	0	3.5	6	Quad, Low-Power, General Purpose Differential Comparator
TLV1393	0.125	2	7	0.7	5	0	1.8	0.5	Dual Low-Voltage, Low-Power Differential Comparator
TLC372	0.15	3	16	0.2	5	0	4	6	Dual General Purpose LinCMOS Differential Comparator
TLC374	0.15	3	16	0.2	5	0	4	6	Quad General Purpose LinCMOS Differential Comparator
TLV1391	0.150	2	7	0.65	5	0	3.8	0.6	Single Differential Comparator
LP311	0.3	4	30	1.2	7.5	-14.5	13.5	1.6	Single, Low-Power, Strobed Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator

TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator
TLV2393	0.65	2	7	0.45	5	0	1.8	4	Dual Low-Voltage Differential Comparator

High Speed Comparators

High Speed Comparators

Device	t_{resp} Low-High (μs) typ	I_{DD}/I_{CC} (mA/ch) max	V_{DD}/V_{CC} (V) min max	V_{IO} (mV) max	V_{ICR} (V) min max	I_{OL} (mA) min	Description
TL714	0.006	12	4.75 5.25	10+	0 5	16	High-Speed Differential Comparator
TL3016	0.0078	12.5	-7 7	3	-3.75 3.5		Ultra-Fast Low-Power Precision Comparator
TL3116	0.0099	14.7	-7 7	3	-5 2.5		Ultra-Fast Low-Power Precision Comparator
TL712	0.025	20	4.75 5.25	5+	0 5	16	Differential Comparator
LM306	0.028	6.8	-6 12	5	-5 5	100	Single, Strobed, High-Speed Differential Comparator
LM311	0.115	7.5	4 30	7.5	-14.7 13.8	8	Single, Strobed Differential Comparator

General Purpose Comparators

Device	V_{IO} (mV) max	V_{DD}/V_{CC} (V) min max	I_{DD}/I_{CC} (mA/ch) max	t_{resp} Low-High (μs) typ	V_{ICR} (V) min max	I_{OL} (mA) min	Description
LM3302	20	2 28	0.2	0.3	0 3.5	6	Quad, General Purpose Differential Comparator
LM339	5	4 30	0.5	0.3	0 3.5	6	Quad, General Purpose Differential Comparator
LM393	5	4 30	1.25	0.3	0 3.5	6	Dual, General Purpose Differential Comparator
LM393A	2	4 30	0.5	0.3	0 3.5	6	Dual, General Purpose Differential Comparator
TL393	5	2 7	0.4	0.2	0 3.8	6	Dual, General Purpose Differential Comparator

Data Converters

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For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

The Texas Instruments family of data converters provide cost effective, versatile solutions for data acquisition systems. This section provides a specification summary for the analog-to-digital converters (ADCs), the digital-to-analog converters (DACs), and special functions such as ADC for flex pager chipset. Fabricated from the TI advanced bipolar, CMOS and BiCMOS fabrication processes, the devices have excellent performance characteristics and quality.

The general purpose ADCs are used for applications such as

- Instrumentation
- Automotive
- Military
- Process Monitoring and Control
- Medical
- Battery Operated Equipment

The general purpose DACs can be used for applications such as

- Programmable Voltage Sources
- Mobile Communications
- Military
- Test Equipment
- Digitally Controlled Amplifiers
- Process Control
- Mass Storage

The high-speed video ADCs and DACs are used for applications such as

- Quadrature Phase Shift Keying (QPSK)
- Digital Down Converters
- Communications
- Digital Set Top Boxes
- Video Signal Processing
- Flat Panel Displays

Data Converters New Product Previews

The following new devices are expected to be released in the near future. For more information, please refer to the InfoNavigator CD-ROM, literature number SLYC005C.

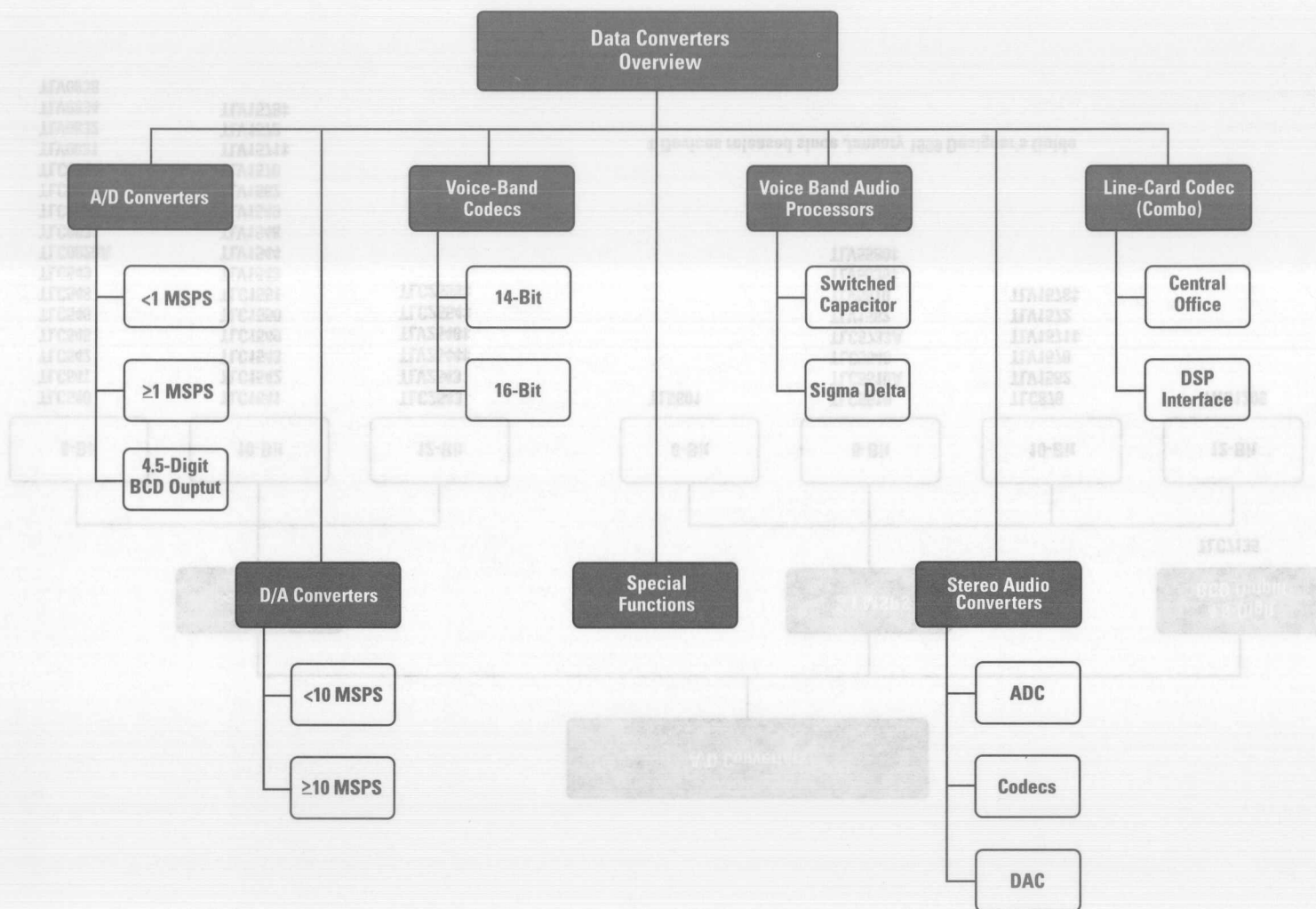
Digital-to-Analog

THS5671	14-Bit 100 MSPS CommsDAC™
TLV5624	8-Bit Single Serial V_{OUT} DAC with Internal Reference
TLV5625	8-Bit Dual Serial V_{OUT} DAC

Web Locations for Specific Product Groups

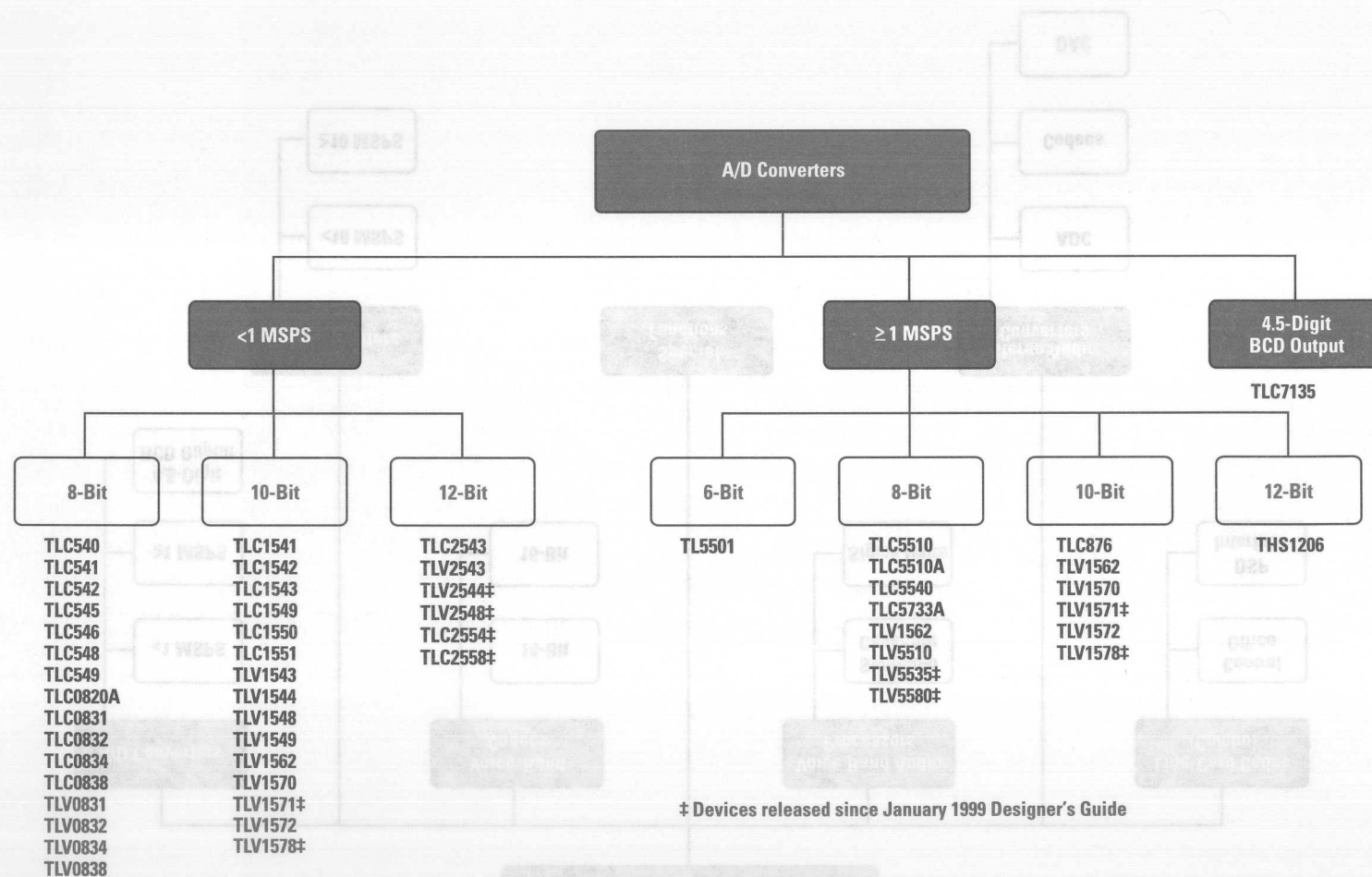
Data Converters www.ti.com/sc/docs/products/msp/dataconv/default.htm

Data Converters Overview



Analog-to-Digital Converters

Decision Tree



Analog-to-Digital Converters

<1 MSPS Analog-to-Digital Converters

Device	Resolution (Bits)	Conv. Rate (kSPS)	Conv. Time (µs)	Supply (V)	Digital Interface Type	Number of Analog Inputs	Power Diss. (mW) typ	SPI Compatible	DNL (LSB)	INL (LSB)	Description
8-Bit											
TLV0838	8	37.9	13	3.3	Serial	8	0.66	Y	0.5	1	3-V Version of TLC0838
TLV0834	8	41	13	3.3	Serial	4	0.66	Y	0.5	1	3-V Version of TLC0834
TLV0832	8	44.7	13	3.3	Serial	2	5	Y	0.5	1	3-V Version of TLC0832
TLV0831	8	49	13	3.3	Serial	1	0.66	Y	0.5	1	3-V Version of TLC0831
TLC0834	8	20	13.3	5	Serial	4	3	Y	1	1	Improved ADC0834
TLC0838	8	20	13.3	5	Serial	8	3	Y	1	1	Improved ADC0838
TLC0832	8	22	13.3	5	Serial	2	7.5	Y	1	1	Improved ADC0832
TLC542	8	25	20	5	Serial	11	6	Y	0.5		Replaces MC145041
TLC0831	8	31	13.3	5	Serial	1	3	Y	1	1	Improved ADC0831
TLC541	8	40	17	5	Serial	11	6	Y	0.5		Compatible with TLC1540 Pinout
TLC546	8	40	17	5	Serial	19	6	Y	0.5		Timing Compatible with TLC540
TLC549	8	40	17	5	Serial	1	8	Y	0.5		Single Input Version of TLC540
TLC548	8	45.5	17	5	Serial	1	8	Y	0.5		Single Input Version of TLC540
TLC540	8	75	9	5	Serial	11	6	Y	0.5		Replaces ADC0811 & MC145040
TLC545	8	76	9	5	Serial	19	6	Y	0.5		Timing Compatible with TLC540
TLC0820A	8	392	2.5	5	Parallel	1	37.5	N	1	1	Replaces AD7820 & ADC0820
10-Bit											
TLV1544	10	85	10	2.7 to 5.5	Serial	4	3	Y	1	1	2.7-V DSP Interface
TLV1548	10	85	10	2.7 to 5.5	Serial	8	3	Y	1	1	2.7-V DSP Interface
TLV1571	10	625	0.5	2.7 to 5.5	Parallel	1	12	N	0.5	0.5	24-Pin SOP, TSSOP
TLV1578	10	625	0.5	2.7 to 5.5	Parallel	8	12	N	0.5	0.5	32-Pin TSSOP
TLV1572	10	1250	1	2.7 to 5.5/ 2.7 to 5.5*	Serial	1	8	Y	0.3	0.5	Fastest 10-Bit Serial ADC
TLV1570	10	1250	1	2.7 to 5.5/ 2.7 to 5.5*	Serial	8	8	Y	1	1	Glueless TMS320 Interface
TLV1562	10,8,4	2000, 3000, 7000	0.5, 0.33, 0.14	2.7 to 5.5/ 2.7 to 5.5*	Parallel	4	6	Y	1.5	1.5	Programmable Resolution vs. Speed
TLV1543	10	38	21	3.3	Serial	11	4	Y	1	1	3-V Version of TLC1543
TLV1549	10	38	21	3.3	Serial	1	1.3	Y	1	1	3-V Version of TLC1549
TLC1541	10	32	21	5	Serial	11	6	Y	1	1	Pinout Compatible 8-, 10- & 12-Bit Versions
TLC1542	10	38	21	5	Serial	11	4	Y	0.5	1	Pinout Compatible 8-, 10- & 12-Bit Versions
TLC1543	10	38	21	5	Serial	11	4	Y	1	1	Plug-In Upgrade for TLC542
TLC1549	10	38	21	5	Serial	1	4	Y	1	1	Plug-In Upgrade for TLC549

* Split supply: Analog Supply/Digital Supply

† Devices released since January 1999 Designer's Guide

<1 MSPS Analog-to-Digital Converters (Continued)

Device	Resolution (Bits)	Conv. Rate (kSPS)	Conv. Time (μ s)	Supply (V)	Digital Interface Type	Number of Analog Inputs	Power Diss. (mW) typ	SPI Compatible	DNL (LSB)	INL (LSB)	Description
12-Bit											
TLC1550	10	164	6	5	Parallel	1	10	N	0.5	1	DSP Front-End with Tri-State Output
TLC1551	10	164	6	5	Parallel	1	10	N	1	1	DSP Front-End with Tri-State Output
TLV2543	12	66	10	3.3	Serial	11	3.3	Y	1		3-V Version of TLC2543
TLC2543	12	66	10	5	Serial	11	5	Y	1	1	Low Cost, High Resolution
TLV2544†	12	200	3.6	2.7 to 5.5	Serial	4	5.5	Y	± 1	± 1	Internal Clock, 8x FIFO, 69 dB SINAD @ $f = 12$ kHz
TLV2548†	12	200	3.6	2.7 to 5.5	Serial	8	5.5	Y	± 1	± 1	Internal Clock, 8x FIFO, 69 dB SINAD @ $f = 12$ kHz
TLC2554†	12	400	1.4	5	Serial	4	9.5	Y	± 1	± 1	8x FIFO, Binary/2's Complement Output
TLC2558†	12	400	1.4	5	Serial	8	9.5	Y	± 1	± 1	8x FIFO, Binary/2's Complement Output

* Split supply: Analog Supply/Digital Supply

† Devices released since January 1999 Designer's Guide

≥1 MSPS Analog-to-Digital Converters

Device	Resolution (Bits)	Conv. Rate (MSPS)	Supply (V)	Digital Interface Type	Number of Analog Inputs	Power Diss. (mW) typ	SNR (dB)	SFDR (dB)	DNL (LSB)	INL (LSB)	Description
6-Bit											
TL5501	6	20	5/5*	Parallel	1	200			0.80%		Low Power, Ultra-High-Speed Video
8-Bit											
TLV1562	10,8,4	2,3,7	2.7 to 5.5/ 2.7 to 5.5*	Parallel	4	6	58.1	-70.3	1.5	1.5	Programmable Resolution vs. Speed
TLV5510	8	10	2.7 to 3.6	Parallel	1	42	38	41	0.75	1	Video and Communications
TLC5510	8	20	5/5*	Parallel	1	90	46	45	0.5	1	Replaces Sony CXD1175
TLC5510A	8	20	5/5*	Parallel	1	90	46	45	0.5	1	0- to 4-V Full-Scale Input
TLC5540	8	40	5/5*	Parallel	1	85	45		0.75	1	Replaces TMC1175
TLC5733A	8	20	5/2.7 to 5.25*	Parallel	3	250			0.75	1	Triple ADC with Clamp
TLV5535†	8	35	3.3	Parallel	1						Pin-Compatible with the TLV5580
TLV5580†	8	80	3.3	Parallel	1	165	46	53	± 0.6	± 1	Up to 700-MHz Typical Input Bandwidth

* Split supply: Analog Supply/Digital Supply

† Devices released since January 1999 Designer's Guide

≥1 MSPS Analog-to-Digital Converters (Continued)

Device	Resolution (Bits)	Conv. Rate (MSPS)	Supply (V)	Digital Interface Type	Number of Analog Inputs	Power Diss. (mW) typ	SNR (dB)	SFDR (dB)	DNL (LSB)	INL (LSB)	Description
10-Bit											
TLV1571‡	10	1.25	2.7 to 5.5	Parallel	1	12	60	-63	±0.5	±0.5	Low Power, 1 Analog Input
TLV1572	10	1.25	2.7 to 5.5/ 2.7 to 5.5*	Serial	1	8		62	0.3	0.5	Fastest 10-Bit Serial ADC
TLV1570	10	1.25	2.7 to 5.5/ 2.7 to 5.5*	Serial	1	8	61	-59	0.5	0.5	Glueless TMS320 Interface
TLV1578‡	10	1.25	2.7 to 5.5	Parallel	8	12	60	-63	±0.5	±0.5	Low Power, 8 Analog Inputs
TLV1562	10,8,4	2,3,7	2.7 to 5.5/ 2.7 to 5.5*	Parallel	4	6	58.1	-70.3	1.5	1.5	Programmable Resolution vs. Speed
TLC876	10	20	5/3.3 to 5*	Parallel	1	107	55	-64	0.5	1.5	Improved AD876
12-Bit											
THS1206‡	12	6	2.7 to 5.5	Parallel	4	210		70	±1	±1.5	Simultaneous Sampling of 4 Inputs, 16-Word FIFO

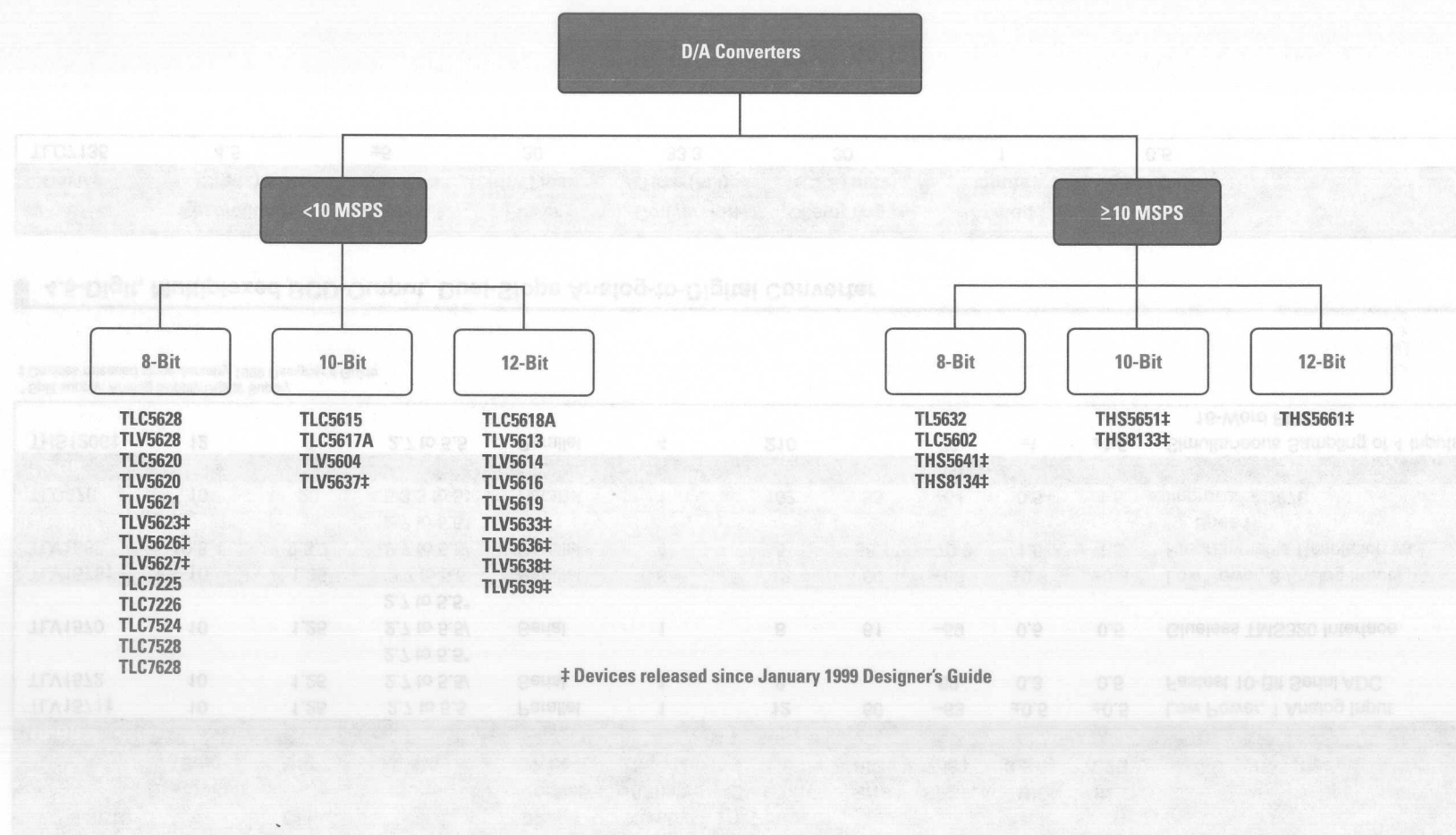
* Split supply: Analog Supply/Digital Supply

‡ Devices released since January 1999 Designer's Guide

4.5-Digit, Multiplexed BCD-Output, Dual-Slope Analog-to-Digital Converter

Device	Resolution (Digits)	Supply (V)	Power (mW) max	Conversion Time (ms)	Sampling (SPS) max	Analog Inputs	Linearity Error (LSB)
TLC7135	4.5	±5	30	33.3	30	1	0.5

Digital-to-Analog Converters



<10 MSPS Digital-to-Analog Converters

Device	Resolution (Bits)	Settling Time (µs)	Supply (V)	Digital Interface Type	Number of DACs	Power (mW) typ	Output (I or V)	SNR+D (dB)	DNL (LSB)	INL (LSB)	Description
8-Bit											
TLV5623‡	8	3 to 9	2.7 to 5.5	Serial	1	2	V	49	±0.7	±0.3	8-Bit Version of TLV5616
TLV5626‡	8	0.8 to 2.8	2.7 to 5.5	Serial	2	10	V	47	±0.1	±0.4	8-Bit Version of TLV5637
TLV5627‡	8	3 to 9	2.7 to 5.5	Serial	4	7	V	49	±0.03	±0.3	8-Bit Version of TLV5604
TLV5628	8	10	2.7 to 5.5	Serial	8	13	V		1	1	3-V Version of TLC5628
TLV5620	8	10	2.7 to 5.5	Serial	4	6	V		1		3-V Version of TLC5620
TLV5621	8	10	2.7 to 5.5	Serial	4	3.3	V		1	1	x2 Output with Powerdown
TLC5628	8	10	5	Serial	8	75	V		1	1	x2 Output
TLC5620	8	10	5	Serial	4	75	V		1	1	x2 Output
TLC7524	8	0.1	5.0 to 15	Parallel	1	5	I		0.5	1	Latch for DSP and µPs
TLC7528	8	0.1	5.0 to 15	Parallel	2	10	I		0.5		Dual Version of TLC7524
TLC7225	8	5	5.0 to 15	Parallel	4	75	V		1	1	Separate Reference for each DAC
TLC7628	8	0.1	11.0 to 15	Parallel	2	20	I		0.5		Dual MDAC with TTL-Compatible Inputs
TLC7226	8	5	15	Parallel	4	96	V		1	1	Replaces AD7226
10-Bit											
TLV5637‡	10	1	2.7 to 5.5	Serial	2	15	V	69	±0.1		Dual, 10-Bit Low-Power, Programmable Settling Time
TLV5604	10	3 to 9	2.7 to 5.5/ 2.7 to 5.5*	Serial	4	9	V	65	1	1	TMS320 Compatible
TLC5617A	10	2.5 to 12.5	5	Serial	2	8.8	V	81	0.5	1	Programmable Settling Time
TLC5615	10	12.5	5	Serial	1	1.3	V	60	0.5	1	Improved Max515
12-Bit											
TLC5618A	12	2.5 to 12.5	5	Serial	2	8.8	V	78	1	4	Programmable Settling Time
TLV5619	12	1	2.7 to 5.5	Parallel	1	4.5	V	69	1	4	TMS320 Compatible
TLV5633‡	12	1	2.7 to 5.5	Parallel	1	18	V	67	±0.3	±1.2	Parallel, Low-Power, Programmable Settling Time
TLV5636‡	12	1	2.7 to 5.5	Serial	1	10	V	69	±0.1		Single, 12-Bit, Low-Power, Programmable Settling Time
TLV5638‡	12	1	2.7 to 5.5	Serial	2	15	V	69	±0.1		Dual, 12-Bit, Low-Power, Programmable Settling Time
TLV5639‡	12	1	2.7 to 5.5	Parallel	1	18	V	67	±0.3	±1.2	Parallel, Low-Power, Programmable Settling Time
TLV5613	12	1 to 3.5	2.7 to 5.5/ 2.7 to 5.5*	Parallel	1	4.2	V	69	1	4	Microcontroller Compatible (8-Bit Data Bus)

* Split supply: Analog Supply/Digital Supply
‡ Devices released since January 1999 Designer's Guide

<10 MSPS Digital-to-Analog Converters (Continued)

<10 MSPS Digital-to-Analog Converters (Continued)

Device	Resolution (Bits)	Settling Time (μs)	Supply (V)	Digital Interface Type	Number of DACs	Power (mW) typ	Output (I or V)	SNR+D (dB)	DNL (LSB)	INL (LSB)	Description
12-Bit (Continued)											
TLV5614	12	3 to 9	2.7 to 5.5/ 2.7 to 5.5*	Serial	4	9.6	V	58	1	3	Programmable Settling Time
TLV5616	12	3 to 9	2.7 to 5.5	Serial	1	2.1	V	65	1	4	Variable Speed

* Split supply: Analog Supply/Digital Supply

‡ Devices released since January 1999 Designer's Guide

≥10 MSPS Digital-to-Analog Converters

Device	Resolution (Bits)	Update Rate (MHz)	Settling Time (ns)	Supply (V)	Digital Interface Type	Number of DACs	Power (mW) typ	SFDR (dB)	SNR (dB)	DNL (LSB)	Description
8-Bit											
TLC5602	8	20	30	5/5*	Parallel	1	80			0.20%	8-Bit, Video Apps.
TL5632	8	60	10	5/5*	Parallel	3	350			0.5	High Speed, Video Apps.
THS5641‡	8	67 MSPS	35	2.7 to 5.5	Parallel	1	175			±0.25	HDTV-Compliant Triple Video DAC
THS8134‡	8	80 MSPS		2.7 to 5.5	Parallel	3	525				HDTV-Compliant Triple Video DAC
10-Bit											
THS5651‡	10	67 MSPS	35	2.7 to 5.5	Parallel	1	175			±0.25	SFDR >75 dB, CommsDAC
THS8133‡	10	80 MSPS		2.7 to 5.5	Parallel	3	525		64	−0.25/0.5	SFDR >75 dB, CommsDAC
12-Bit											
THS5661‡	12	67 MSPS	35	2.7 to 5.5	Parallel	1	175			±0.5	SFDR >75 dB, CommsDAC

* Split supply: Analog Supply/Digital Supply

‡ Devices released since January 1999 Designer's Guide

Voice-Band Codecs

Device	Band Pass Filter (3 dB) (kHz)	Low Pass Filter (3 dB) (kHz)	Sampling Rate (kHz) max	Sin x/x Correction	Internal V Ref	Supply Voltage (V)	Power Dissipation (mW)	Description
14-Bit								
TLC32044	150 to 3600 Hz	3600 Hz	19.2	Yes	Yes	±5	275	Bypassable ADC High Pass Filter & Programmable Gain
TLC32045	150 to 3600 Hz	3600 Hz	19.2	Yes	Yes	±5	275	Bypassable ADC High Pass Filter & Programmable Gain
TLC32040	300 to 3400 Hz	3400 Hz	19.2	No	Yes	±5	275	Bypassable ADC Band Pass Filter & Programmable Gain
TLC32046	300 to 7200 Hz	7200 Hz	25	Yes	Yes	±5	275	Bypassable ADC High Pass Filter & Programmable Gain
TLC320AC01	Up to 10.8	10.8	25	Yes	Yes	+5	100	Bandwidth Independent of Sampling Rate
TLC320AC02	Up to 10.8	10.8	25	Yes	Yes	+5	100	Same as AC01 except FSD Delay
TLC32047	450 to 10.95	10.95	25	Yes	Yes	±5	275	Bypassable ADC High Pass Filter & Programmable Gain
16-Bit								
TLV320AD543‡	Up to 4.96	4.96	11.025	No	Yes	+3	90	Low-Voltage Codec
TLC320AD535	Up to 4.96	4.96	11.025	No	Yes	+5/+3.3	240	Dual Channel Voice/Data Codec
TLC320AD545	Up to 4.96	4.96	11.025	No	Yes	+5/+3.3	120	Data/Fax Codec w/Hybrid Op Amps
TLC320AD56	Up to 8.82	8.82	22.05	No	Yes	+5 or +5A/+3D*	100	85-/87-dB Dynamic Range for DAC/ADC
TLC320AD50	Up to 9.92	9.92	22.05	No	Yes	+5 or +5A/+3D*	120	Typical 89-dB SNR—Supports 3 Slaves
TLC320AD52	Up to 9.92	9.92	22.05	No	Yes	+5 or +5A/+3D*	120	Like TLC320AD50 but Supports 1 Slave

* Single 5-V power supply or 5-V analog and 3.3-V digital supplies

‡ Devices released since January 1999 Designer's Guide

CCD Imaging Analog Front Ends

Device	Resolution (Bits)	Samples/ Sec (MSPS)	Supply Voltage(s) (V)	P _d (mW) typ	Gain (dB) max min	DNL (±LSB) max	INL (±LSB) max	Description
TLC8188‡	10	4	5	190	14 0	±2	±1	CIS/CCD Scanner AFE Using Pipeline-Architecture ADC
TLC976‡	10	20	+5/3.3	330	39 5	±1.25	±2.5	10-Bit, 20-MSPS, Area CCD Signal Processor

‡ Devices released since January 1999 Designer's Guide

Special Functions

Special Functions

TLV5590

Device	Special Function	Full Scale Error	Zero Scale Error	Differential Nonlinearity
TLV5590	ADC for Flex Pager Chipset	1 LSB	3 LSB	<1 LSB

Voice Band Audio Processors

Voice Band Audio
ProcessorsSwitched
Capacitor

TLV320AC36
TLV320AC37
TLV320AC56
TCM320AC36
TCM320AC37
TCM320AC56

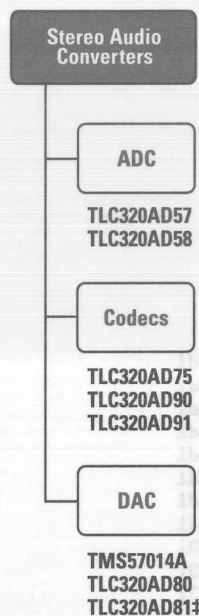
Sigma Delta

TWL1101

Device	Architecture	Linear Resolution	Operating Voltage ($\pm 10\%$)	Program-mability	Number of Channels	Companding	Noise Cancellation	DTMF/Tone Generation	Description
Switched Capacitor									
TLV320AC36	Switched Cap Filter	13-Bit	3	N	1	μ -Law	Y	N	Voice Band Audio Codec
TLV320AC37	Switched Cap Filter	13-Bit	3	N	1	A-Law	Y	N	Voice Band Audio Codec
TLV320AC56	Switched Cap Filter	13-Bit	3	N	1	μ -Law	N	N	Voice Band Audio Codec
TCM320AC36	Switched Cap Filter	13-Bit	5	N	1	μ -Law	Y	N	Voice Band Audio Codec
TCM320AC37	Switched Cap Filter	13-Bit	5	N	1	A-Law	Y	N	Voice Band Audio Codec
TCM320AC56	Switched Cap Filter	13-Bit	5	N	1	μ -Law	N	N	Voice Band Audio Codec
Sigma Delta									
TWL1101	Sigma Delta	13-Bit	3	Y - I ² C Interface	1*	μ -Law	N	N	Voice Band Audio Codec

* Part has 2 MIC in's and 2 ear out's, selectable

Stereo Audio Converters



‡ Devices released since January 1999 Designer's Guide

Device	Architecture	Resolution (Bits)	Power Dissipation (mW) typ	Sampling Rate (kHz)	SNR (dB)	PSSR (dB)	Supply Voltage (V)	Description
ADC								
TLC320AD57	Sigma Delta	18	200	48	97		5	High Performance Stereo ADC
TLC320AD58	Sigma Delta	18	250	48	100		5	High Performance Stereo ADC
Codecs								
TLC320AD90	Sigma Delta	16	280	48	90	55	3/5	AC97 Multimedia CODEC
TLC320AD91	Sigma Delta	18	190	48	94	46	3/5	AC97 Multimedia CODEC
TLC320AD75	Sigma Delta	20	350	48	104		5	High Performance Stereo ADA
DAC								
TLC320AD80	Sigma Delta	16	260	48	85		5	Audio System
TLC320AD81‡	Sigma Delta	18	150	48	95		3/5	Digital EQ with DAC
TMS57014A	Sigma Delta	18	350	48	100		5	Dual Stereo Over Sample DAC

‡ Devices released since January 1999 Designer's Guide

Line-Card Codec (Combo)

LC350V014	Signal Data	18	320	48	100	0	Dual Stereo Over Sample DAC
LC350V014	Signal Data	18	120	48	80	32	Digital EQ with DAC
LC350V080	Signal Data	18	300	48	80	2	Audio Processor
LC350V032	Signal Data	50	320	48	100	2	High Performance Stereo VDA
LC350V081	Signal Data	18	180	48	80	32	VC01 Multichannel CODEC
LC350V080	Signal Data	18	300	48	80	32	VC01 Multichannel CODEC
LC350V088	Signal Data	48	320	48	100	2	High Performance Stereo VDA
LC350V021	Signal Data	18	300	48	80	2	High Performance Stereo VDA

Line-Card Codec (Combo)

Central Office

TCM29C13
TCM29C13A
TCM29C14
TCM29C14A
TCM29C16
TCM29C16A
TCM29C17
TCM29C17A
TCM37C14A
TCM37C15A
TCM38C17
TP3054A
TP3054B
TP3056B
TP3057A
TP3057B
TP3064B
TP3067A
TP3067B

DSP Interface

TCM29C18
TCM29C19
TCM29C23
TCM320AC54

DAC

Processor

VDA

Central Office
DSP Interface

Line-Card Codec (Combo)

Device	Clock Frequency (MHz) typ	Companding	Timing	Supply Voltage (V) typ	Number of Channels	Description
Central Office						
TP3054A	1.536, 1.544, 2.048	μ-Law	National	±5	1	Combination Codec/Filter
TP3054B	1.536, 1.544, 2.048	μ-Law	National	±5	1	Combination Codec/Filter
TP3064B	1.536, 1.544, 2.048	μ-Law	National	±5	1	Combination Codec/Filter
TP3057A	1.536, 1.544, 2.048	A-Law	National	±5	1	Combination Codec/Filter
TP3057B	1.536, 1.544, 2.048	A-Law	National	±5	1	Combination Codec/Filter
TP3067A	1.536, 1.544, 2.048	A-Law	National	±5	1	Combination Codec/Filter
TP3067B	1.536, 1.544, 2.048	A-Law	National	±5	1	Combination Codec/Filter
TCM29C13	1.536, 1.544, 2.048	Both	Intel	±5	1	Combination Codec/Filter
TCM29C13A	1.536, 1.544, 2.048	Both	Intel	±5	1	Combination Codec/Filter
TCM29C14	1.536, 1.544, 2.048	Both	Intel	±5	1	Combination Codec/Filter
TCM29C14A	1.536, 1.544, 2.048	Both	Intel	±5	1	Combination Codec/Filter
TCM37C14A	1.536, 1.544, 2.048	Both	Intel	±5	1	PCM Combo with Programmable Gain Control
TP3056B	1.536, 1.544, 2.048	Both	National	±5	1	Combined PCM Codec and Filter
TCM29C16	2.048	μ-Law	Intel	±5	1	Combination Codec/Filter
TCM29C16A	2.048	μ-Law	Intel	±5	1	Combination Codec/Filter
TCM29C17	2.048	A-Law	Intel	±5	1	8-Bit PCM Codec/Filter
TCM29C17A	2.048	A-Law	Intel	±5	1	8-Bit PCM Codec/Filter
TCM37C15A	2.048	A-Law	Intel	±5	1	PCM Combo with Programmable Gain Control
TCM38C17	2.048	Both	Intel	+5	4	Four-Channel (Quad) PCM Combo
DSP Interface						
TCM29C19	1.536	μ-Law	Intel	±5	1	Combination Codec/Filter, Analog Interface to DSP
TCM320AC54	1.536, 1.544, 2.048	μ-Law	National	±5	1	Monolithic Serial Interface Combined PCM Codec and Filter
TCM29C18	2.048	μ-Law	Intel	±5	1	Combination Codec/Filter, Analog Interface to DSP
TCM29C23	Up to 4.096	Both	Intel	±5	1	Combination Codec/Filter, Analog Interface to DSP

Interface Products

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For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

Interface New Product Previews

The following new devices are expected to be released in the near future. For more information, please refer to the InfoNavigator CD-ROM, literature number SLYC005C.

Device	Description
SN65ALS1176	Differential Bus Transceiver
SN65LVDS1	Single LVDS Driver
SN65LVDT2	Single LVDS Receiver with Integrated Termination
SN65LVDS32A	Quad LVDS Receiver with Wide Common Mode Range
SN65LVDS3486A	Quad LVDS Receiver with Wide Common Mode Range
SN65LVDS9637A	Dual LVDS Receiver with Wide Common Mode Range
SN65LVDT32A	Quad LVDS Receiver with Integrated Termination
SN65LVDT3486A	Quad LVDS Receiver with Integrated Termination
SN65LVDT9637A	Dual LVDS Receiver with Integrated Termination
SN65LVDS116	1:16 LVDS-to-LVDS Splitter
SN65LVDS387	16-Channel LVDS Driver
SN75LP196	Low-Power Multiple RS-232 Drivers and Receivers
SN75970B1/B2	SCSI Differential Converter-Control
SN75971B1/B2	SCSI Differential Converter-Data

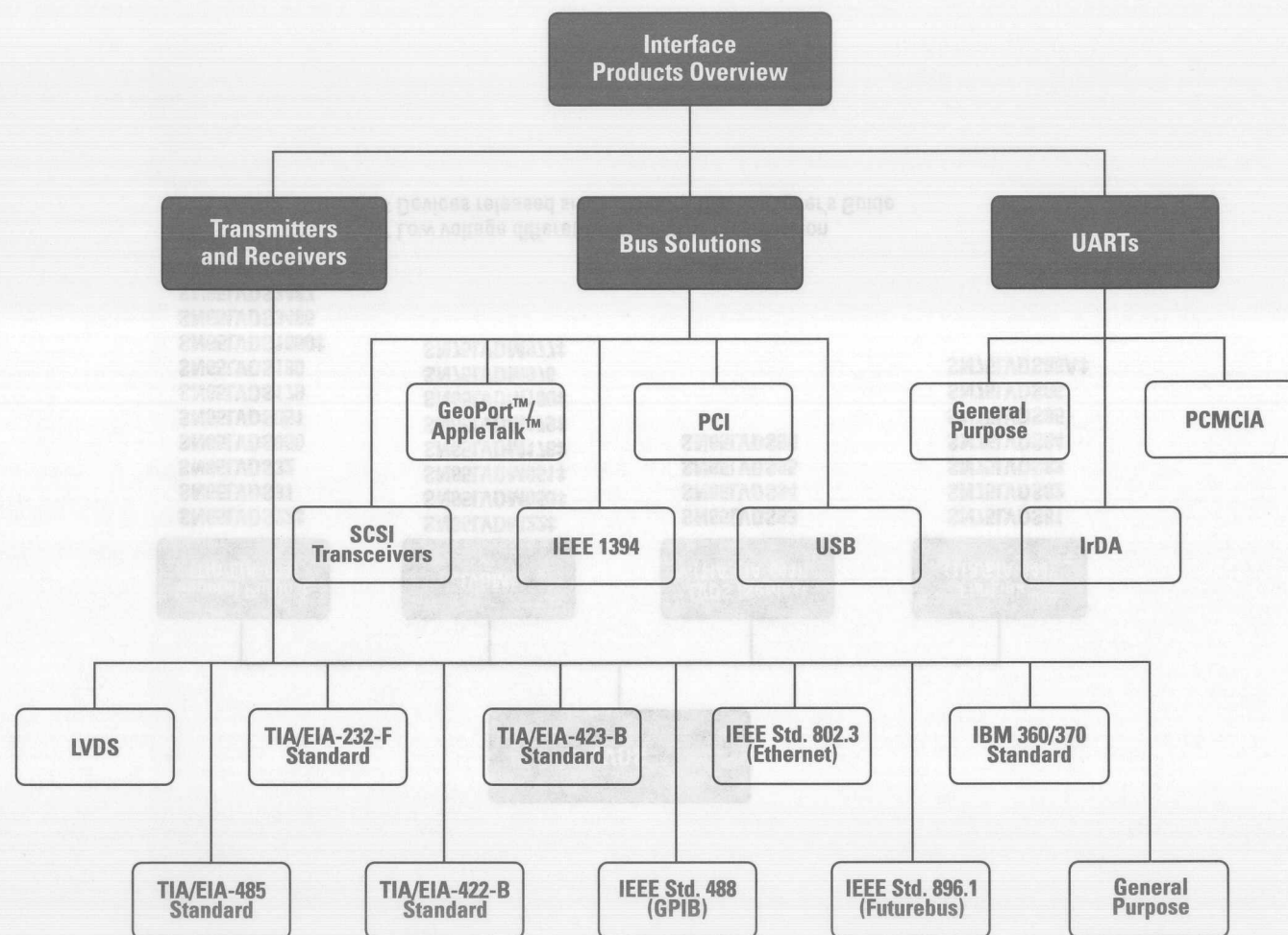
Bus Solutions

TSB12LV32	General Purpose
TSB41LV01	400 Mbps, 3.3-V, 1-port PHY IEEE 1394, 1394a
TSB41LV03A	400 Mbps, 3.3-V, 3-port PHY IEEE 1394, 1394a
TSB41LV04A	400 Mbps, 3.3-V, 4-port PHY IEEE 1394, 1394a
TSB41LV06A	400 Mbps, 3.3-V, 6-port PHY IEEE 1394, 1394a

Web Locations for Specific Product Groups

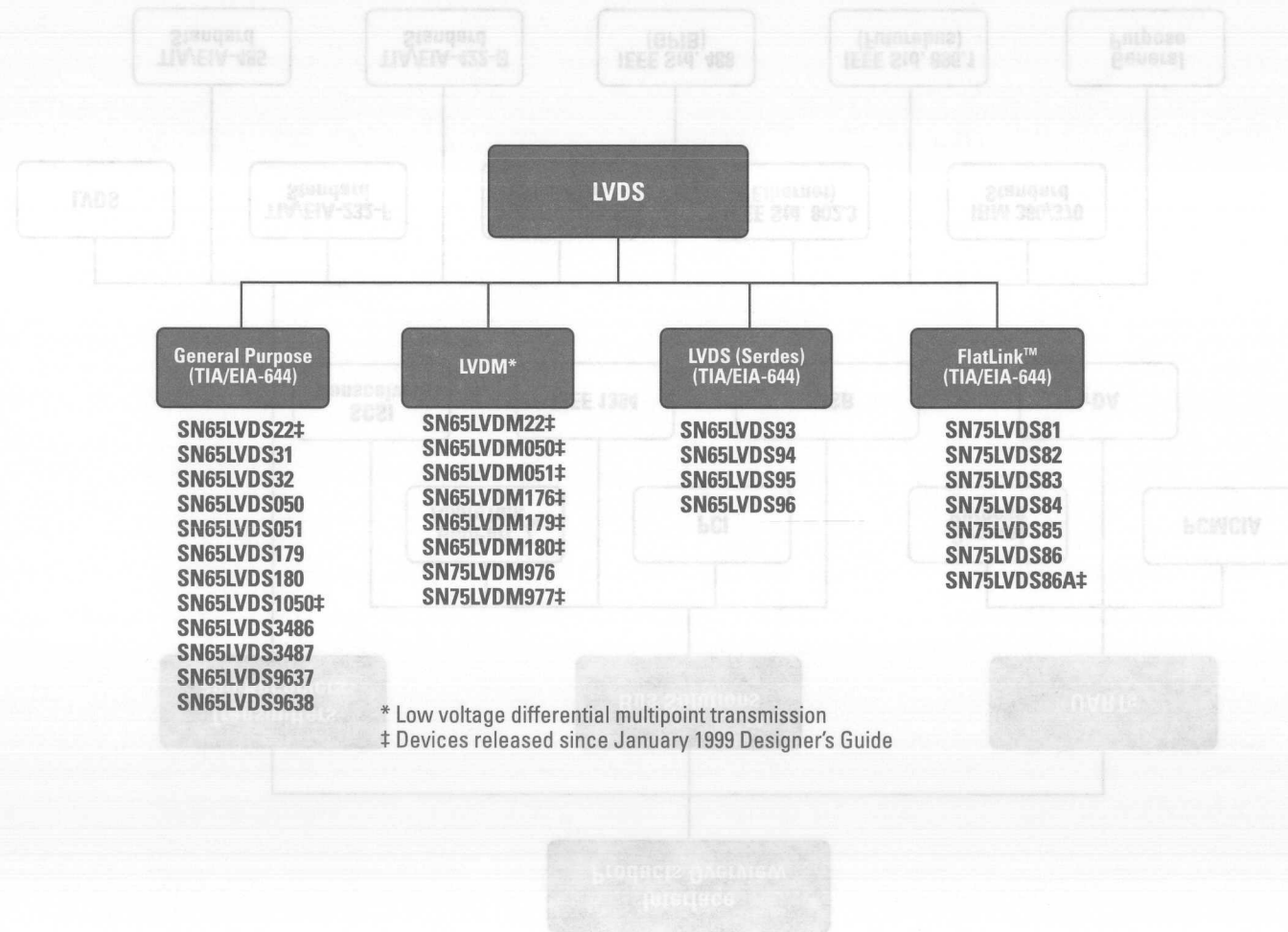
Interface Products	www.ti.com/sc/docs/products/msp/intrface/default.htm
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Interface Products Overview



Transmitters & Receivers—LVDS

Decision Tree



Transmitters & Receivers—LVDS

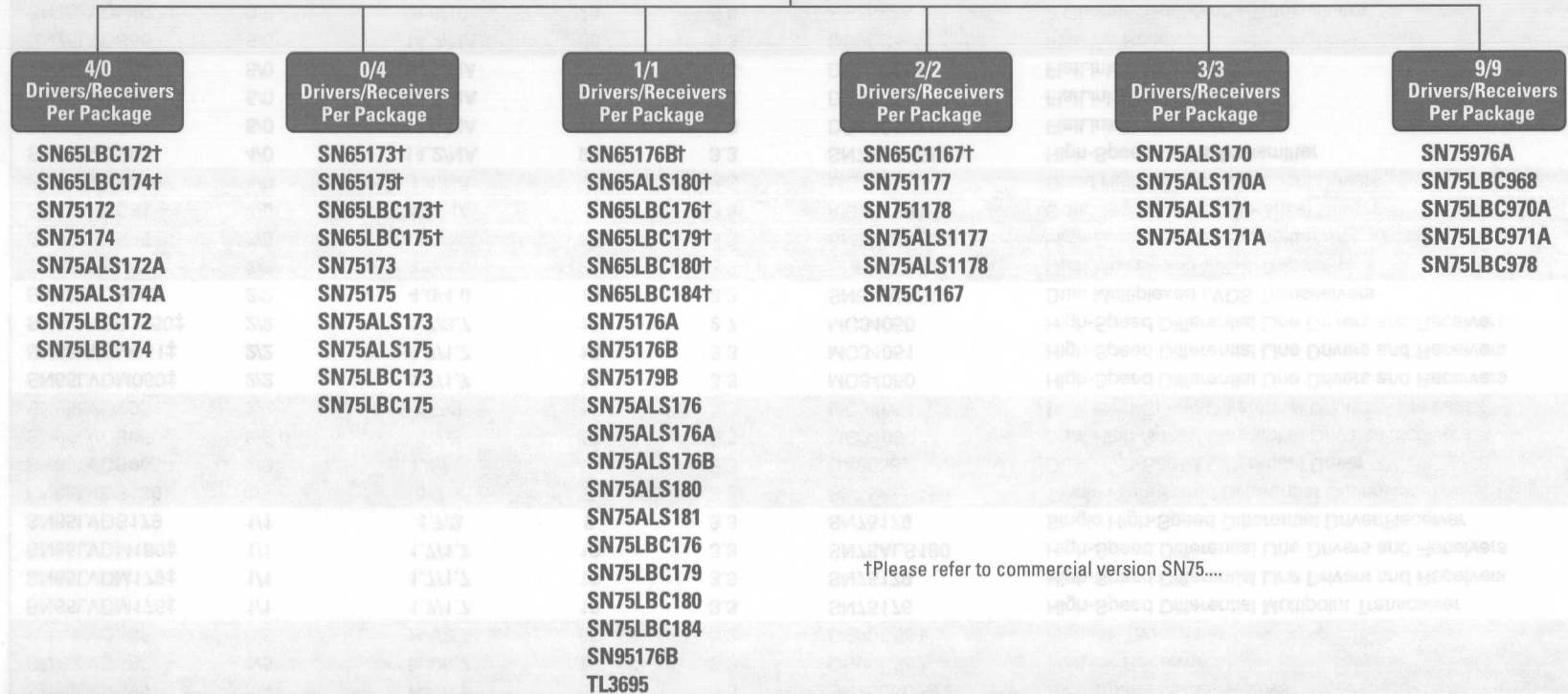
Transmitters & Receivers—LVDS

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	Supply Voltage(s) (V) typ	Footprint	Description
SN65LVDS9637	0/2	NA/2.2	5.5	3.3	UA9637	Dual High-Speed Differential Receiver
SN75LVDS86A†	0/3	0.0/5.0	43	3.3	SN75LVDS86	FlatLink Receiver
SN65LVDS96	0/3	NA/8.7	60	3.3	SN75LVDS86	High-Speed LVDS Receiver
SN65LVDS32	0/4	NA/2.2	10	3.3	AM26LS32	Quad High-Speed Differential Receivers
SN65LVDS3486	0/4	NA/2.2	10	3.3	MC3486	Quad High-Speed Differential Receivers
SN65LVDS94	0/4	NA/8.7	62	3.3	SN75LVDS82	High-Speed LVDS Receiver
SN75LVDS82	0/5	NA/8.7	74	3.3	DS90C582	FlatLink Receiver
SN75LVDS85	0/5	NA/8.7	69	3.3	DS90C561	FlatLink Transmitter
SN65LVDM176†	1/1	1.7/1.7	10	3.3	SN75176	High-Speed Differential Multipoint Transceiver
SN65LVDM179†	1/1	1.7/1.7	10	3.3	SN75179	High-Speed Differential Line Drivers and Receivers
SN65LVDM180†	1/1	1.7/1.7	10	3.3	SN75ALS180	High-Speed Differential Line Drivers and Receivers
SN65LVDS179	1/1	1.7/3	9	3.3	SN75179	Single High-Speed Differential Driver/Receiver
SN65LVDS180	1/1	1.7/3	9	3.3	SN75ALS180	Single High-Speed Differential Driver/Receiver
SN65LVDS9638	2/0	1.4/NA	4.7	3.3	UA9638	Dual High-Speed Differential Driver
SN65LVDS050	2/2	1.7/3	12	3.3	MC34050	Dual High-Speed Differential Drivers/Receivers
SN65LVDS051	2/2	1.7/3	12	3.3	MC34051	Dual High-Speed Differential Drivers/Receivers
SN65LVDM050†	2/2	1.7/1.7	19	3.3	MC34050	High-Speed Differential Line Drivers and Receivers
SN65LVDM051†	2/2	1.7/1.7	19	3.3	MC34051	High-Speed Differential Line Drivers and Receivers
SN65LVDS1050†	2/2	1.7/3.7	12	2.7	MC34050	High-Speed Differential Line Drivers and Receivers
SN65LVDS22†	2/2	4.0/4.0	13	3.3	SN65LVDS22	Dual Multiplexed LVDS Transceivers
SN65LVDM22†	2/2	4.0/4.0	21	3.3	SN65LVDS22	Dual Multiplexed LVDS Transceivers
SN65LVDS95	3/0	14.2/NA	85	3.3	SN75LVDS85	High-Speed LVDS Transmitter
SN65LVDS31	4/0	1.4/NA	9	3.3	AM26LS31	Quad High-Speed Differential Drivers
SN65LVDS3487	4/0	1.4/NA	9	3.3	MC3487	Quad High-Speed Differential Drivers
SN65LVDS93	4/0	14.2/NA	95	3.3	SN75LVDS83	High-Speed LVDS Transmitter
SN75LVDS81	5/0	14.2/NA	72	3.3	DS90C581	FlatLink Transmitter
SN75LVDS83	5/0	14.2/NA	72	3.3	DS90C581	FlatLink Transmitter
SN75LVDS84	5/0	14.2/NA	68	3.3	DS90C561	FlatLink Transmitter
SN75LVDS86	5/0	14.2/NA	68	3.3	DS90C562	FlatLink Receiver
SN75LVDM977†	9/9	8.8/10	26	5.0	SN75976	9-Channel Dual-Mode Transceivers
SN75LVDM976	9/9	5.5/8.4	26	5	SN75LBC976	9-Channel Dual-Mode SCSI Transceiver

† Devices released since January 1999 Designer's Guide

Transmitters & Receivers—TIA/EIA-485 Standard

TIA/EIA-485
Standard



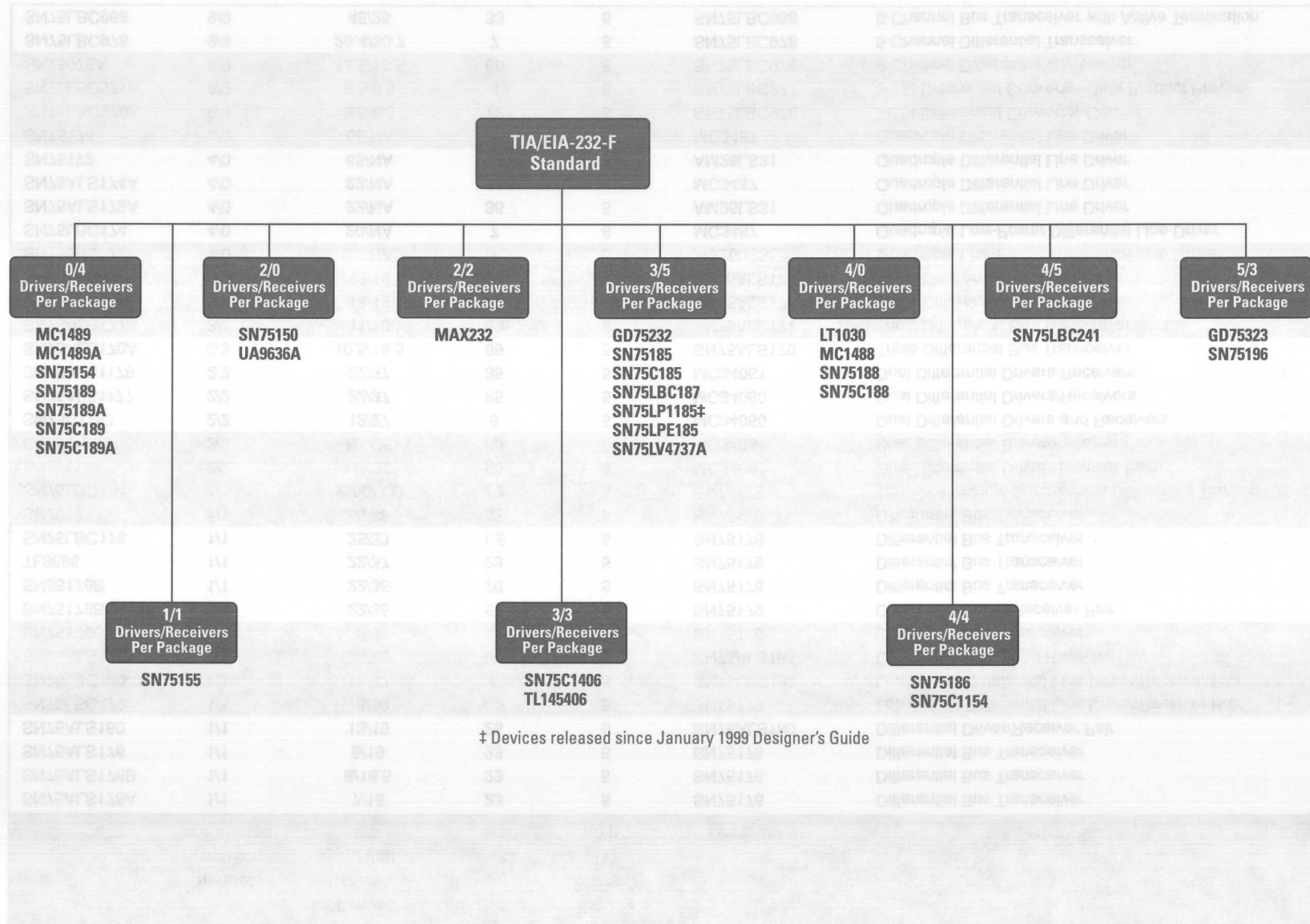
†Please refer to commercial version SN75....

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	Supply Voltage(s) (V) typ	Footprint	Description
SN75ALS173	0/4	NA/27	16	5	AM26LS32	Quadruple Differential Line Receiver
SN75ALS175	0/4	NA/27	16	5	MC3486	Quadruple Differential Line Receiver
SN75LBC173	0/4	NA/30	11	5	AM26LS32	Quadruple Low-Power Differential Line Receiver
SN75LBC175	0/4	NA/30	11	5	MC3486	Quadruple Low-Power Differential Line Receiver
SN75173	0/4	NA/35		5	AM26LS32	Quadruple Differential Line Receiver
SN75175	0/4	NA/35		5	MC3486	Quadruple Differential Line Receiver

Transmitters & Receivers—TIA/EIA-485 Standard (Continued)

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	Supply Voltage(s) (V) typ	Footprint	Description
SN75ALS176A	1/1	7/18	23	5	SN75176	Differential Bus Transceiver
SN75ALS176B	1/1	8/16.5	23	5	SN75176	Differential Bus Transceiver
SN75ALS176	1/1	8/19	23	5	SN75176	Differential Bus Transceiver
SN75ALS180	1/1	13/19	25	5	SN75ALS180	Differential Driver/Receiver Pair
SN75LBC179	1/1	18/30	4.2	5	SN75179	Low-Power Differential Line Driver/Receiver Pair
SN75LBC180	1/1	18/33	5	5	SN75LBC180	Low-Power Differential Line Driver/Receiver Pair
SN75ALS181	1/1	20/25	21	5	SN75ALS181	Differential Driver and Receiver Pair
SN75176B	1/1	22/35	42	5	SN75176	Differential Bus Transceiver
SN75179B	1/1	22/35	57	5	SN75179	Differential Driver/Receiver Pair
SN95176B	1/1	22/35	70	5	SN75176	Differential Bus Transceiver
TL3695	1/1	22/37	23	5	SN75176	Differential Bus Transceiver
SN75LBC176	1/1	25/33	1.5	5	SN75176	Differential Bus Transceiver
SN75176A	1/1	60/35	35	5	SN75176	Differential Bus Transceiver
SN75LBC184	1/1	1500/300	12	5	SN75176	Transient Voltage Suppression Differential Transceiver
SN751177	2/2	NA/35	80	5	MC34050	Dual Differential Driver/Receiver Pairs
SN751178	2/2	NA/35	80	5	MC34051	Dual Differential Driver/Receiver Pairs
SN75C1167	2/2	12/27	5	5	MC34050	Dual Differential Drivers and Receivers
SN75ALS1177	2/2	22/37	35	5	MC34050	Dual Differential Drivers/Receivers
SN75ALS1178	2/2	22/37	35	5	MC34051	Dual Differential Drivers/Receivers
SN75ALS170A	3/3	10.5/16.5	69	5	SN75ALS170	Triple Differential Bus Transceiver
SN75ALS171A	3/3	11/16	69	5	SN75ALS171	Triple Differential Bus Transceiver
SN75ALS170	3/3	13/19	69	5	SN75ALS170	Triple Differential Bus Transceiver
SN75ALS171	3/3	13/19	69	5	SN75ALS171	Triple Differential Bus Transceiver
SN75LBC172	4/0	20/NA	7	5	AM26LS31	Quadruple Low-Power Differential Line Driver
SN75LBC174	4/0	20/NA	7	5	MC3487	Quadruple Low-Power Differential Line Driver
SN75ALS172A	4/0	22/NA	36	5	AM26LS31	Quadruple Differential Line Driver
SN75ALS174A	4/0	22/NA	36	5	MC3487	Quadruple Differential Line Driver
SN75172	4/0	65/NA	38	5	AM26LS31	Quadruple Differential Line Driver
SN75174	4/0	65/NA	38	5	MC3487	Quadruple Differential Line Driver
SN75LBC970A	9/9	8.5/8.5	72	5	SN75LBC970	SCSI Differential Converter-Control
SN75LBC971A	9/9	8.5/8.5	4	5	SN75LBC971	SCSI Differential Converter-Data Product Preview
SN75976A	9/9	13.5/16.5	60	5	SN75LBC976	9-Channel Differential Transceiver
SN75LBC978	9/9	26.4/30.7	7	5	SN75LBC978	9-Channel Differential Transceiver
SN75LBC968	9/9	45/25	33	5	SN75LBC968	9-Channel Bus Transceiver with Active Termination

Transmitters & Receivers—TIA/EIA-232-F Standard



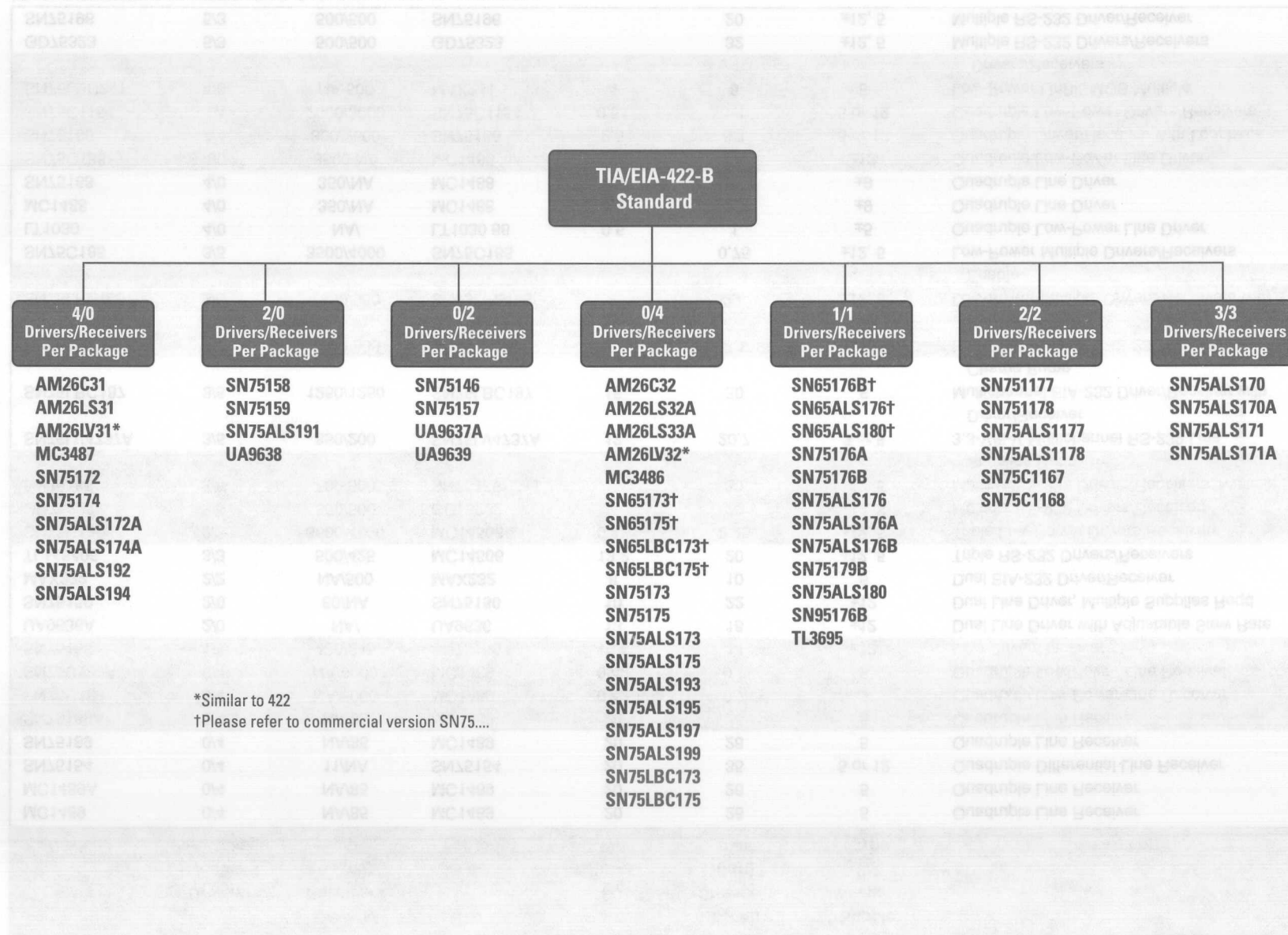
† Devices released since January 1999 Designer's Guide

Transmitters & Receivers—TIA/EIA-232-F Standard

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	Footprint	I_{CC} (mA) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Description
MC1489	0/4	NA/85	MC1489	20	26	5	Quadruple Line Receiver
MC1489A	0/4	NA/85	MC1489	20	26	5	Quadruple Line Receiver
SN75154	0/4	11/NA	SN75154	20	35	5 or 12	Quadruple Differential Line Receiver
SN75189	0/4	NA/85	MC1489	20	26	5	Quadruple Line Receiver
SN75189A	0/4	NA/85	MC1489	20	26	5	Quadruple Line Receiver
SN75C189	0/4	NA/6000	MC1489	0.42	0.7	5	Quadruple Low-Power Line Receiver
SN75C189A	0/4	NA/6000	MC1489	0.42	0.7	5	Quadruple Low-Power Line Receiver
SN75155	1/1	480/245	SN75155	10.4	14	±12	Line Driver/Receiver
UA9636A	2/0	NA/	UA9636	13	18	±12	Dual Line Driver with Adjustable Slew Rate
SN75150	2/0	60/NA	SN75150	10	22	±12	Dual Line Driver, Multiple Supplies Req'd
MAX232	2/2	NA/500	MAX232	8	10	5	Dual EIA-232 Driver/Receiver
TL145406	3/3	500/425	MC14506	13.2	20	±12, 5	Triple RS-232 Drivers/Receivers
SN75C1406	3/3	3500/4000	MC14506	0.32	0.45	±12, 5	Triple Low-Power Drivers/Receivers
GD75232	3/5	500/500	GD75232		20	±12, 5	Multiple RS-232 Drivers/Receivers
SN75185	3/5	500/500	SN75185		30	±12, 5	Multiple RS-232 Drivers/Receivers, Multiple Supplies Req'd
SN75LV4737A	3/5	850/200	SN75LV4737A	12	20.7	3 or 5	3.3-V/5-V Multichannel RS-232 Line Driver/Receiver
SN75LBC187	3/5	1250/1250	SN75LBC187	15	30	5	Multichannel EIA-232 Driver/Receiver with Charge Pump
SN75LP1185‡	3/5	1600/900	SN75LP185		2.1	±12, 5	Low-Power Multiple RS-232 Drivers/Receivers
SN75LPE185	3/5	1600/900	SN75LPE185		2.4	±12, 5	Low-Power Multiple Drivers/Receivers with Enable
SN75C185	3/5	3500/4000	SN75C185		0.75	±12, 5	Low-Power Multiple Drivers/Receivers
LT1030	4/0	NA/	LT1030 68	0.5	1	±5	Quadruple Low-Power Line Driver
MC1488	4/0	350/NA	MC1488	4.5	25	±9	Quadruple Line Driver
SN75188	4/0	350/NA	MC1488	4.5	25	±9	Quadruple Line Driver
SN75C188	4/0	3500/NA	MC1488	0.09	0.16	±12	Quadruple Low-Power Line Driver
SN75186	4/4	800/2000	SN75186	2.5	8.1	5 or 12	Quadruple Driver/Receiver with Loopback
SN75C1154	4/4	2500/3000	SN75C1154	0.51	1.1	5 or 12	Quadruple Low-Power Drivers/Receivers
SN75LBC241	4/5	NA/500	MAX241	4	8	5	Low-Power LinBiCMOS Multiple Drivers/Receivers
GD75323	5/3	500/500	GD75323		32	±12, 5	Multiple RS-232 Drivers/Receivers
SN75196	5/3	500/500	SN75196		20	±12, 5	Multiple RS-232 Driver/Receiver

‡ Devices released since January 1999 Designer's Guide

Transmitters & Receivers—TIA/EIA-422-B Standard



Transmitters & Receivers—TIA/EIA-422-B Standard

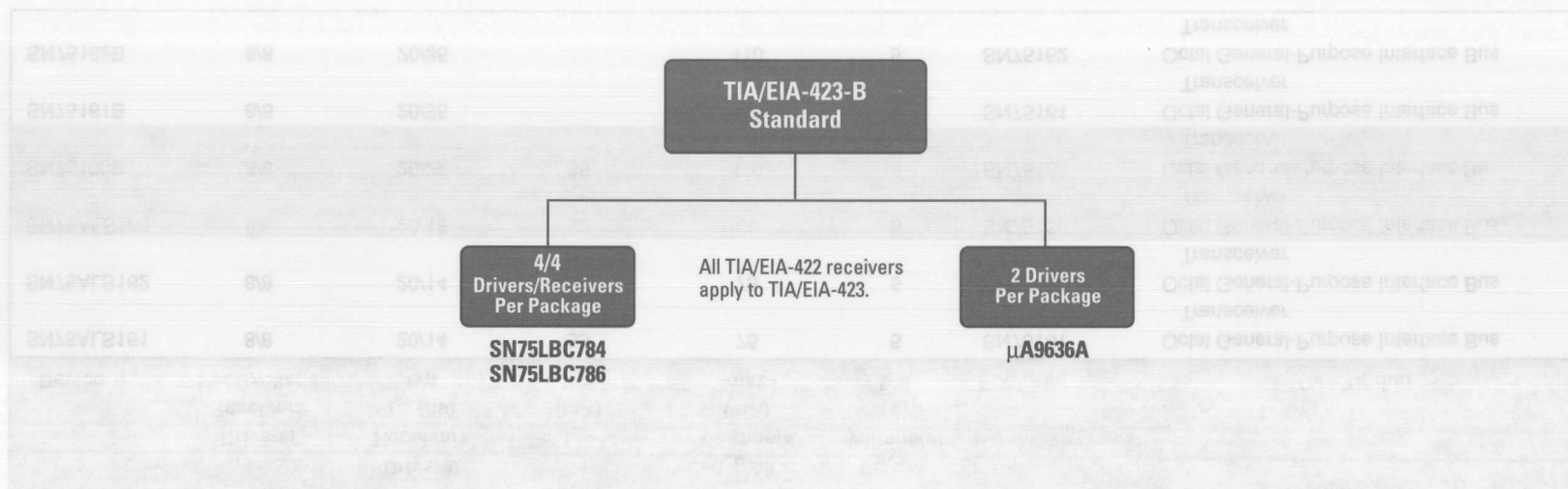
Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75157	0/2	NA/25	35	50	5	SN75157	Dual Differential Line Receiver
UA9637A	0/2	NA/25	35	50	5	UA9637	Dual Differential Line Receiver
UA9639	0/2	NA/85	35	50	5	UA9639	Dual Differential Line Receiver
SN75146	0/2	NA/300	35	50	5	UA9637	Dual Differential Line Receiver
AM26LV32	0/4	NA/20	8	17	3.3	AM26LS32	Low-Voltage High-Speed Quadruple Differential Line Receiver
SN75ALS193	0/4	NA/22	22	35	5	AM26LS32	Quadruple Differential Line Receiver
SN75ALS195	0/4	NA/22	22	35	5	MC3486	Quadruple Differential Line Receiver
SN75ALS197	0/4	NA/22	35	35	5	AM26LS32	Quadruple Differential Line Receiver
SN75ALS199	0/4	NA/22	35	35	5	MC3486	Quadruple Differential Line Receiver
AM26C32	0/4	NA/27	10	15	5	AM26LS32	Quadruple Differential Line Receiver
SN75ALS173	0/4	NA/27	16	24	5	AM26LS32	Quadruple Differential Line Receiver
SN75ALS175	0/4	NA/27	16	24	5	MC3486	Quadruple Differential Line Receiver
SN75LBC173	0/4	NA/30	11	20	5	AM26LS32	Quadruple Low-Power Differential Line Receiver
SN75LBC175	0/4	NA/30	11	20	5	MC3486	Quadruple Low-Power Differential Line Receiver
AM26LS32A	0/4	NA/35	52	70	5	AM26LS32	Quadruple Differential Line Receiver
AM26LS33A	0/4	NA/35	38	70	5	AM26LS32	Quadruple Differential Line Receiver
MC3486	0/4	NA/35	32	85	5	MC3486	Quadruple Differential Line Receiver with 3-State Outputs
SN75173	0/4	NA/35		70	5	AM26LS32	Quadruple Differential Line Receiver
SN75175	0/4	NA/35		70	5	MC3486	Quadruple Differential Line Receiver
SN75ALS176A	1/1	7/18	23	30	5	SN75176	Differential Bus Transceiver
SN75ALS176B	1/1	8/16.5	23	30	5	SN75176	Differential Bus Transceiver
SN75ALS176	1/1	8/19	23	30	5	SN75176	Differential Bus Transceiver
SN75ALS180	1/1	13/19	25	30	5	SN75ALS180	Differential Driver/Receiver Pair
SN75176B	1/1	22/35	42	70	5	SN75176	Differential Bus Transceiver
SN75179B	1/1	22/35	57	70	5	SN75179	Differential Driver/Receiver Pair
SN95176B	1/1	22/35	70	70		SN75176	Differential Bus Transceiver
TL3695	1/1	22/37	23	50	5	SN75176	Differential Bus Transceiver
SN75176A	1/1	60/35	35	50	5	SN75176	Differential Bus Transceiver

Continued on page 3-12

TIA/EIA-422-B Standard (Continued)

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75ALS191	2/0	7/NA	32	40	5	UA9638	Dual Differential Line Driver
UA9638	2/0	20/NA	45	65	5	UA9638	Dual High-Speed Differential Line Driver
SN75158	2/0	25/NA	37	50	5	SN75158	Dual Differential Line Driver
SN75159	2/0	25/NA	47	65	5	SN75159	Dual Differential Line Driver with 3-State Outputs
SN751177	2/2	NA/35	80	110	5	MC34050	Dual Differential Driver/Receiver Pairs
SN751178	2/2	NA/35	80	110	5	MC34051	Dual Differential Driver/Receiver Pairs
SN75C1167	2/2	12/27	5	9	5	MC34050	Dual Differential Drivers/Receivers
SN75C1168	2/2	12/27	5	9	5	MC34051	Dual Differential Drivers/Receivers
SN75ALS1177	2/2	22/37	35	50	5	MC34050	Dual Differential Drivers/Receivers
SN75ALS1178	2/2	22/37	35	50	5	MC34051	Dual Differential Drivers/Receivers
SN75ALS170A	3/3	10.5/16.5		90	5	SN75ALS170	Triple Differential Bus Transceiver
SN75ALS171A	3/3	11/16		90	5	SN75ALS171	Triple Differential Bus Transceiver
SN75ALS170	3/3	13/19	69	90	5	SN75ALS170	Triple Differential Bus Transceiver
SN75ALS171	3/3	13/19	69	90	5	SN75ALS171	Triple Differential Bus Transceiver
AM26C31	4/0	12/NA	1.5	3	5	AM26LS31	Quadruple Differential Line Driver
AM26LV31	4/0	12/NA		0.1	3.3	AM26LS31	Low-Voltage High-Speed Quadruple Differential Line Driver
SN75ALS192	4/0	14/NA	26	45	5	AM26LS31	Quadruple Differential Line Driver
SN75ALS194	4/0	14/NA	26	45	5	MC3487	Quadruple Differential Line Driver
AM26LS31	4/0	20/NA	32	80	5	AM26LS31	Quadruple Differential Line Driver
MC3487	4/0	20/NA		85	5	MC3487	Quadruple Differential Line Driver
SN75ALS172A	4/0	22/NA	36	55	5	AM26LS31	Quadruple Differential Line Driver
SN75ALS174A	4/0	22/NA	36	55	5	MC3487	Quadruple Differential Line Driver
SN75172	4/0	65/NA	38	60	5	AM26LS31	Quadruple Differential Line Driver
SN75174	4/0	65/NA	38	60	5	MC3487	Quadruple Differential Line Driver

Transmitters & Receivers—TIA/EIA-423-B Standard



Device	Drivers/Receivers Per Package	Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75LBC784	4/4	1000	60	12	±12	SN75LBC784	Quadruple RS-423-B Driver/Receiver
SN75LBC786	4/4	1000	60	12	±12	SN75LBC784	Quadruple RS-423-B Driver/Receiver with Loopback
UA9636A	2/0		26	36	±12	UA9636	Dual Line Driver with Adjustable Slew Rate

Transmitters & Receivers—IEEE Std. 488 (GPIB)

IEEE Std. 488
(GPIB)

8/8
Drivers/Receivers
Per Package

SN75160B
SN75161B
SN75162B
SN75ALS160*
SN75ALS161*
SN75ALS162

*The devices are suitable for use for IEEE Standard 488 applications to the extent of the operating conditions and characteristics specified in the data sheet.

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75ALS161	8/8	20/14	55	75	5	SN75161	Octal General-Purpose Interface Bus Transceiver
SN75ALS162	8/8	20/14	55	75	5	SN75162	Octal General-Purpose Interface Bus Transceiver
SN75ALS160	8/8	20/18	52	80	5	SN75160	Octal General-Purpose Interface Bus Transceiver
SN75160B	8/8	20/22	85	110	5	SN75160	Octal General-Purpose Interface Bus Transceiver
SN75161B	8/8	20/35		110	5	SN75161	Octal General-Purpose Interface Bus Transceiver
SN75162B	8/8	20/35		110	5	SN75162	Octal General-Purpose Interface Bus Transceiver

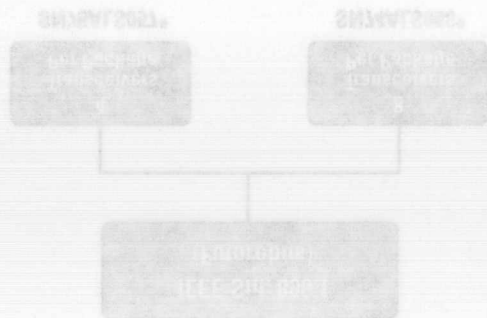
Transmitters & Receivers—IEEE Std. 802.3 (Ethernet)

IEEE Std. 802.3
(Ethernet)

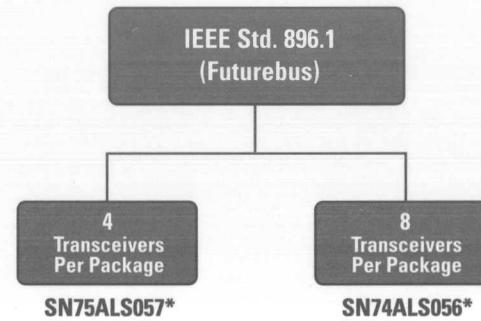
2/2
Drivers/Receivers
Per Package

SN75ALS085

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75ALS085	2/2	15/15	225	5	SN75ALS085	LAN Access Unit Interface Dual Driver/Receiver



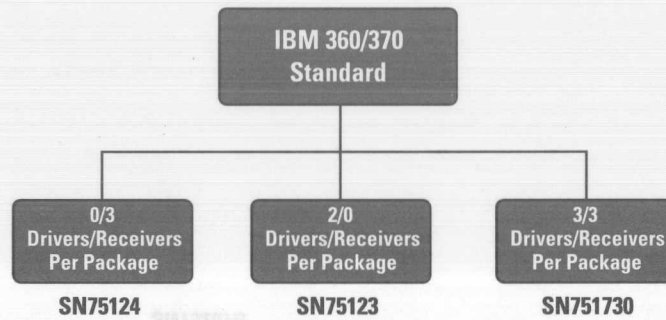
Transmitters & Receivers—IEEE Std. 896.1 (Futurebus)



*The devices are suitable for use for IEEE Standard 896.1 applications to the extent of the operating conditions and characteristics specified in the data sheet.

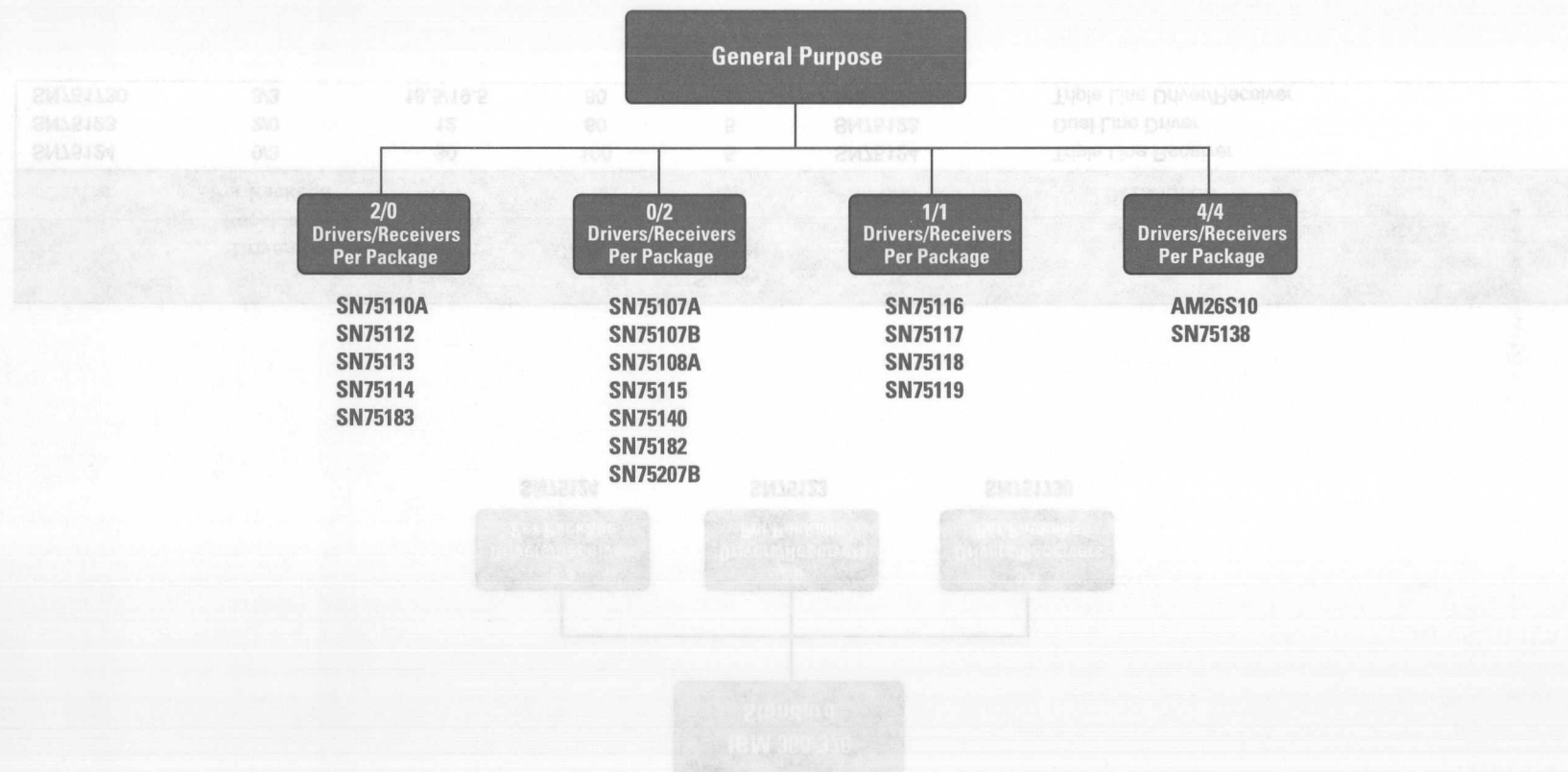
Device	Drivers/ Receivers Per Package	Supply Voltage(s) (V) typ	I _{CC} All Channels (mA) max	Footprint	Description
SN75ALS057	4/4	5	40	DS3897	Trapezoidal-Waveform Interface Bus Transceiver
SN75ALS056	8/8	5	75	DS3896	Trapezoidal-Waveform Interface Bus Transceiver

Transmitters & Receivers—IBM 360/370 Standard



Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{PD} (ns) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75124	0/3	30	100	5	SN75124	Triple Line Receiver
SN75123	2/0	12	60	5	SN75123	Dual Line Driver
SN751730	3/3	18.5/19.5	80	5	SN751730	Triple Line Driver/Receiver

Transmitters & Receivers—General Purpose



Transmitters & Receivers—General Purpose

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	I_{CC} (mA) typ	I_{CC} All Channels (mA) max	Supply Voltage(s) (V) typ	Footprint	Description
SN75107A	0/2	19	18	30	5	SN75107	Dual Line Receiver
SN75107B	0/2	19	18	30	5	SN75107	Dual Line Receiver
SN75108A	0/2	19	18	30	5	SN75107	Dual Line Receiver
SN75140	0/2	/35	20	35	5	SN75140	Dual Line Receiver, Single Ended
SN75207B	0/2	/35	18	30	-5	SN75107	Dual High-Sensitivity Line REC, Differential, $-6 < V_{ICM} < 6$ V
SN75182	0/2	/45	6.8	10.2	5	DS8820	Dual Differential Line Receiver, $-3 < V_{ICM} < 3$ V
SN75115	0/2	/75	32	50	5	SN75115	Dual Differential Line Receiver, $-15 < V_{ICM} < 15$ V
SN75116	1/1	/30	42	60	5	SN75116	Differential Line Transceiver, $-15 < V_{ICM} < 15$ V
SN75117	1/1	/30	42	60	5	SN75117	Differential Line Transceiver, $0 < V_{ICM} < 6$ V
SN75118	1/1	/30	42	60	5	SN75118	Differential Line Transceiver, $-15 < V_{ICM} < 15$ V
SN75119	1/1	/30	42	60	5	SN75119	Differential Line Transceiver, $0 < V_{ICM} < 6$ V
SN75110A	2/0	15/	23	35	-5	SN75110	Dual Line Driver, Differential, Current Mode, Multiple Supplies Req'd
SN75112	2/0	15/	25	40	-5	SN75112	Dual Line Driver, Differential, Current Mode, Multiple Supplies Req'd
SN75183	2/0	18/	10	18	5	DS8830	Quadruple Differential Line Driver, Voltage Mode
SN75113	2/0	30/	47	65	5	SN75113	Dual Differential Line Driver, Voltage Mode
SN75114	2/0	30/	37	50	5	SN75114	Dual Differential Line Driver, Voltage Mode
AM26S10	4/4		45	80	5	AM26S10	Quad Bus Transceiver, Single Ended, Open Collector
SN75138	4/4	24/15	50	65	5	SN75138	Quadruple Bus Transceiver, Single Ended, Open Collector

Bus Solutions

Bus Solutions

SCSI
Transceivers

SN75976A
SN75ALS170
SN75ALS170A
SN75ALS171
SN75ALS171A
SN75ALS176
SN75ALS176A
SN75ALS176B
SN75LBC968
SN75LBC970A
SN75LBC971A
SN75LBC978
SN75LVDM976
SN75LVDM977

GeoPort™/
AppleTalk™

SN75LBC771
SN75LBC773
SN75LBC775
SN75LBC776
SN75LBC777

Gigabit
Serdes

SN65LVDS93‡
SN65LVDS94‡
SN65LVDS95‡
SN65LVDS96‡

IEEE 1394

TSB11LV01
TSB12LV01A‡
TSB12C01A
TSB12LV21A
TSB12LV21B
TSB12LV22
TSB12LV23‡
TSB12LV31
TSB12LV41
TSB12LV41A‡
TSB12LV42
TSB14C01A
TSB21LV03C‡
TSB41LV02‡
TSB41LV03
TSB41LV06‡

PCI

HPC3130
PCI1210
PCI1211
PCI1220
PCI1221
PCI1225
PCI1250A
PCI1251B
PCI1410‡
PCI1420‡
PCI1450‡
PCI2030
PCI2031
PCI4450‡
PCI930
PCI950

USB

TUSB2043‡
TUSB2046‡
TUSB2070
TUSB2140B

‡ Devices released since January 1999 Designer's Guide

Bus Solutions—SCSI Transceivers

Device	Drivers/ Receivers Per Package	Drivers/ Receivers t_{pd} (ns) typ	Footprint	I_{cc} (mA) typ	Description
SN75ALS176A	1/1	7/18	SN75176	23	Differential Bus Transceiver
SN75ALS176B	1/1	8/16.5	SN75176	23	Differential Bus Transceiver
SN75ALS176	1/1	8/19	SN75176	23	Differential Bus Transceiver
SN75ALS170A	3/3	10.5/16.5	SN75ALS170	69	Triple Differential Bus Transceiver
SN75ALS171A	3/3	11/16	SN75ALS171	69	Triple Differential Bus Transceiver
SN75ALS170	3/3	13/19	SN75ALS170	69	Triple Differential Bus Transceiver
SN75ALS171	3/3	13/19	SN75ALS171	69	Triple Differential Bus Transceiver
SN75LVDM976	9/9	5.5/8.4	SN75LBC976	26	9-Channel Dual-Mode SCSI Transceiver
SN75LVDM977	9/9	5.5/8.4	SN75LBC976	26	9-Channel Dual-Mode SCSI Transceiver
SN75LBC970A	9/9	8.5/8.5	SN75LBC970	72	SCSI Differential Converter-Control
SN75LBC971A	9/9	8.5/8.5	SN75LBC971	4	SCSI Differential Converter-Data Product Preview
SN75976A	9/9	13.5/16.5	SN75LBC976	60	9-Channel Differential Transceiver
SN75LBC978	9/9	26.4/30.7	SN75LBC978	7	9-Channel Differential Transceiver
SN75LBC968	9/9	45/25	SN75LBC968	33	9-Channel Bus Transceiver with Active Termination

Bus Solutions—GeoPort™/AppleTalk™

Device	Supply Voltage(s) (V) typ	Description
SN75LBC771	±5	GeoPort Transceiver
SN75LBC773	±5	GeoPort Transceiver
SN75LBC775	5	Single-Chip AppleTalk/LocalTalk Transceiver
SN75LBC776	5	Single-Chip GeoPort Transceiver
SN75LBC777	5	Single-Chip GeoPort/AppleTalk Transceiver

Bus Solutions—Gigabit Serdes

Device	Drivers/ Receivers Per Package	Footprint	I_{cc} (mA) typ	Description
SN65LVDS93‡	4/0	SN75LVDS83	72	28:4 LVDS Driver
SN65LVDS94‡	0/4	SN75LVDS84	60	4:28 LVDS Receiver
SN65LVDS95‡	3/0	SN75LVDS85	68	21:3 LVDS Driver
SN65LVDS96‡	0/3	SN75LVDS86	80	3:21 LVDS Receiver

‡ Devices released since January 1999 Designer's Guide

Bus Solutions—IEEE 1394

Device	Supply Voltage(s) (V) typ	Description
TSB11LV01	3.3	Single 3-V 1-Port Cable Transceiver/Arbiter
TSB12LV01A†	3.3	High-Speed 32-Bit M/V I/F 1394 Link-Layer Controller
TSB12LV21A	3.3	PCI-to-1394 Link-Layer Controller w/1k FIFO
TSB12LV21B	3.3	PCI to 1394 Link-Layer Controller w/2k FIFOs
TSB12LV22	3.3	Open Host Controller Interface (OHCI) 1394, 1394a Link-Layer Controller
TSB12LV23†	3.3	OHCI-Lynx 1394.a Link-Layer Controller w/CardBus I/F
TSB12LV31	3.3	General Purpose Link-Layer Controller
TSB12LV41	3.3	Consumer Electronics 1394 Link-Layer Controller w/MPEG2 Packetization
TSB12LV41A†	3.3	Consumer Electronics 1394 Link-Layer Controller w/MPEG2 Packetization
TSB12LV42	3.3	Consumer Electronics 1394 Link-Layer Controller w/DV Packetization
TSB21LV03C†	3.3	3-Port 100/200/400Mbps IEEE 1394 Cable Arbiter/Transceiver
TSB41LV02†	3.3	2-Port 100/200/400Mbps IEEE 1394, 1394a Cable Arbiter/Transceiver
TSB41LV03	3.3	3-Port 100/200/400Mbps IEEE 1394, 1394a Cable Arbiter/Transceiver
TSB41LV06†		6-Port 100/200/400Mbps IEEE 1394, 1394a Cable Arbiter/Transceiver
TSB12C01A	5	High-Speed Serial-Bus Link-Layer Controller
TSB14C01A	5	Single-Port Backplane Physical Layer Transceiver

† Devices released since January 1999 Designer's Guide

Bus Solutions—PCI

Device	Supply Voltage(s) (V) typ	Description
HPC3130		Hot Plug Controller
PCI1210	3.3, 5	Single Socket CardBus Controller
PCI1211	3.3, 5	Single Socket CardBus Controller
PCI1410†	3.3, 5	Single Socket CardBus Controller
PCI1220	3.3, 5	Dual Socket CardBus Controller w/External ZV
PCI1221	3.3, 5	Dual Socket CardBus Controller w/External ZV
PCI1225	3.3, 5	Dual Socket CardBus Controller w/External ZV
PCI1420†	3.3, 5	Dual Socket CardBus Controller w/External ZV
PCI1250A	3.3, 5	Dual Socket CardBus Controller w/Internal ZV
PCI1251B	3.3, 5	Dual Socket CardBus Controller w/Internal ZV
PCI1450†	3.3, 5	Dual Socket CardBus Controller w/Internal ZV
PCI4450†	3.3, 5	Integrated CardBus/1394 Controller
PCI2031	3.3, 5	33-MHz, 32-Bit PCI-to-PCI Bridge
PCI930	3.3	3-to-1 Zoom Video Switch
PCI950	5	Serial Interrupt Stream Deserializer

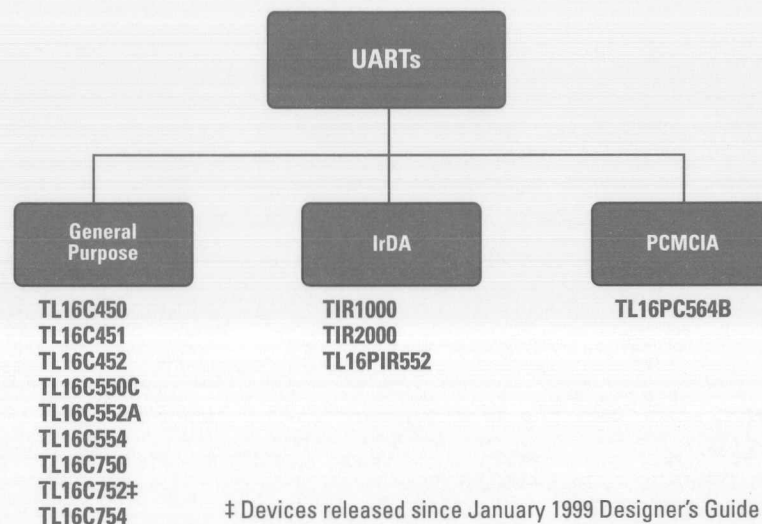
† Devices released since January 1999 Designer's Guide

Bus Solutions—USB

Device	Supply Voltage(s) (V) typ	Description
TUSB2046†	3.3	4-Port HUB, USB 1.1 Compliant
TUSB2043†	3.3	4-Port HUB, USB 1.1 Compliant
TUSB2070	3.3	7-Port HUB for the Universal Serial Bus
TUSB2140B	3.3/5	4-Port USB Hub w/I ² C Microcontroller Interface

† Devices released since January 1999 Designer's Guide

UARTs



General Purpose UARTs

Device	Device Type	Description
TL16C450	Single	Asynchronous Communications Element without FIFO
TL16C451	Single	Asynchronous Communications Element with Parallel Port and without FIFO
TL16C452	Dual	Asynchronous Communications Element with Parallel Port and without FIFO
TL16C550C	Single	Asynchronous Communications Element with 16-Byte FIFOs & Auto Flow Control
TL16C552A	Dual	Asynchronous Communications Element with 16-Byte FIFOs & Parallel Port
TL16C554	Quad	Asynchronous Communications Element with 16-Byte FIFOs
TL16C750	Single	Asynchronous Communications Element (64-Byte FIFOs, Auto Flow Control, Low-Power Modes)
TL16C754	Quad	Asynchronous Communications Element (64-Byte FIFOs, Auto Flow Control, Low-Power Modes)
TL16C752†	Dual	Asynchronous Communications Element (64-Byte FIFOs, Auto Flow Control, Low-Power Modes)

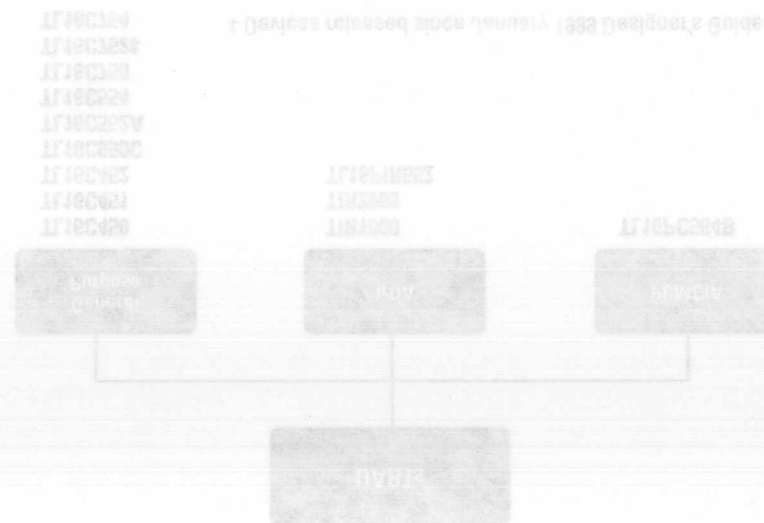
† Devices released since January 1999 Designer's Guide

IrDA UARTs

Device	Device Type	Description
TIR1000	N/A	Standalone IrDA Encoder & Decoder
TIR2000	N/A	High-Speed IrDA Compliant Controller
TL16PIR552	Dual	Asynchronous Communications Element (16-Byte FIFOs, Selectable IR & 1284 Modes)

PCMCIA UARTs

Device	Device Type	Description
TL16PC564B	Single	Asynchronous Communications Element (64-Byte FIFOs, PCMCIA Interface)



Power Management Products

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For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

Power Management New Product Previews

The following new devices are expected to be released in the near future. For more information, please refer to the InfoNavigator CD-ROM, literature number SLYC005C.

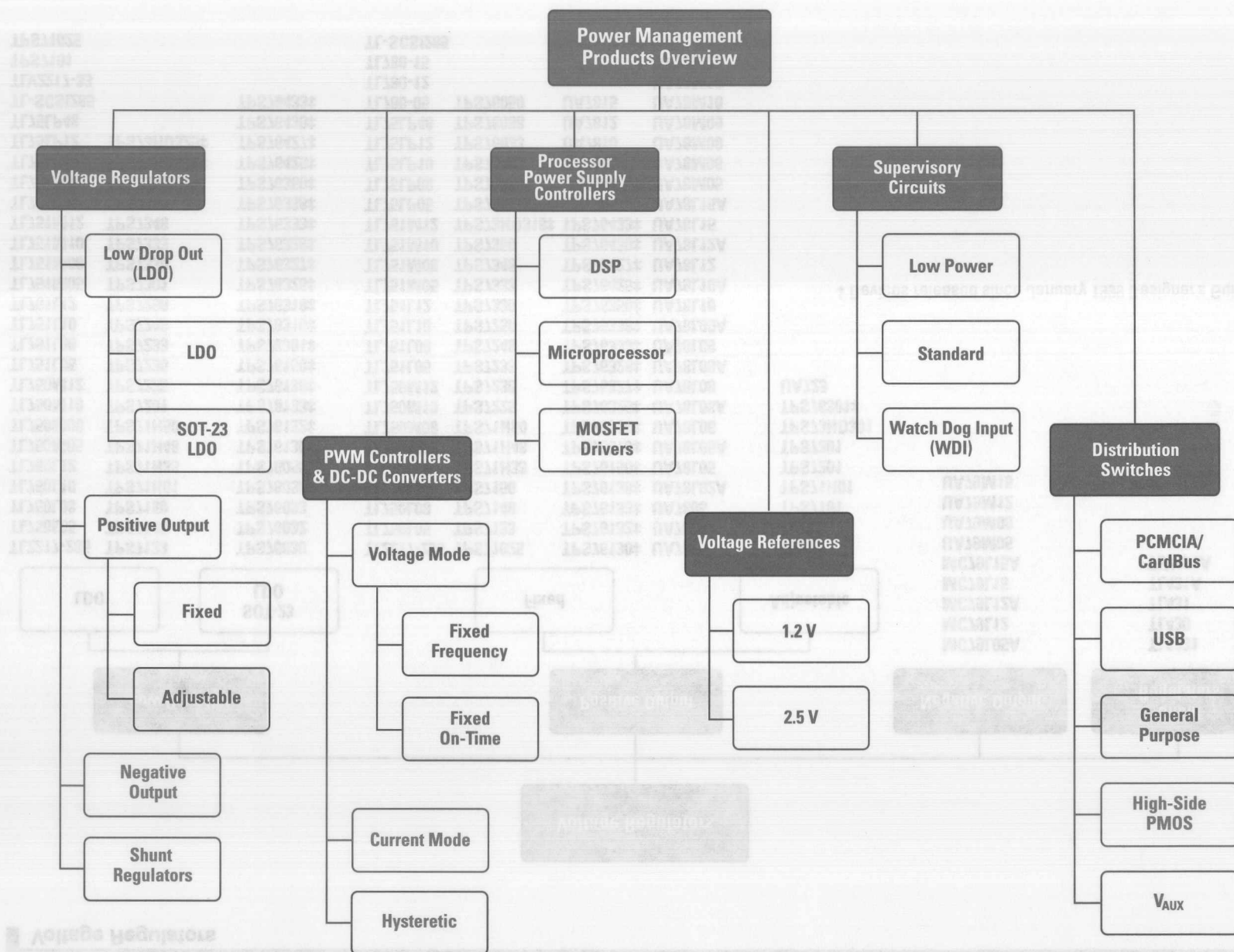
Device	Description	Device	Description
Distribution Switches		Low Dropout Voltage Regulators (Continued)	
PCMCIA/CardBus		Single Output	
TPS2214	24-pin Version of TPS2216	TPS73H018	1.8-V, 750-mA Output Current
V_{AUX}		TPS76701	Adjustable, Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS2100	250-mΩ N, 4.5-Ω P, 2 in, 1 out, SOT-23, -EN (V _{AUX})	TPS76715	1.5-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS2101	250-mΩ N, 4.5-Ω P, 2 in, 1 out, SOT-23, +EN (V _{AUX})	TPS76718	1.8-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
Low Dropout Voltage Regulators		TPS76725	2.5-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
SOT-23 Packaging		TPS76727	2.7-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS76901	Adjustable, Ultra-Low Supply Current	TPS76728	2.8-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS76912	1.2-V Ultra-Low Supply Current	TPS76730	3.0-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS76915	1.5-V Ultra-Low Supply Current	TPS76733	3.3-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS76918	1.8-V Ultra-Low Supply Current	TPS76750	5.0-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes SVS
TPS76925	2.5-V Ultra-Low Supply Current	TPS76801	Adjustable, Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS76927	2.7-V Ultra-Low Supply Current	TPS76815	1.5-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS76928	2.8-V Ultra-Low Supply Current	TPS76818	1.8-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS76930	3.0-V Ultra-Low Supply Current	TPS76825	2.5-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS76933	3.3-V Ultra-Low Supply Current	TPS76827	2.7-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS76950	5.0-V Ultra-Low Supply Current	TPS76828	2.8-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS77001	Adjustable, Ultra-Low Supply Current	TPS76830	3.0-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS77012	1.2-V Ultra-Low Supply Current	TPS76833	3.3-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS77015	1.5-V Ultra-Low Supply Current	TPS76850	5.0-V Ultra-Fast Transient, Low Quiescent Current LDO, Includes Power Good
TPS77018	1.8-V Ultra-Low Supply Current		
TPS77025	2.5-V Ultra-Low Supply Current		
TPS77027	2.7-V Ultra-Low Supply Current		
TPS77030	3.0-V Ultra-Low Supply Current		
TPS77033	3.3-V Ultra-Low Supply Current		
TPS77050	5.0-V Ultra-Low Supply Current		
Dual Outputs (DSP Applications)			
TPS767D301	3.3-V and Adjustable, 1-A Output Current		
TPS767D318	3.3 V and 1.8 V, 1-A Output Current		
TPS767D325	3.3 V and 2.5 V, 1-A Output Current		

Web Location

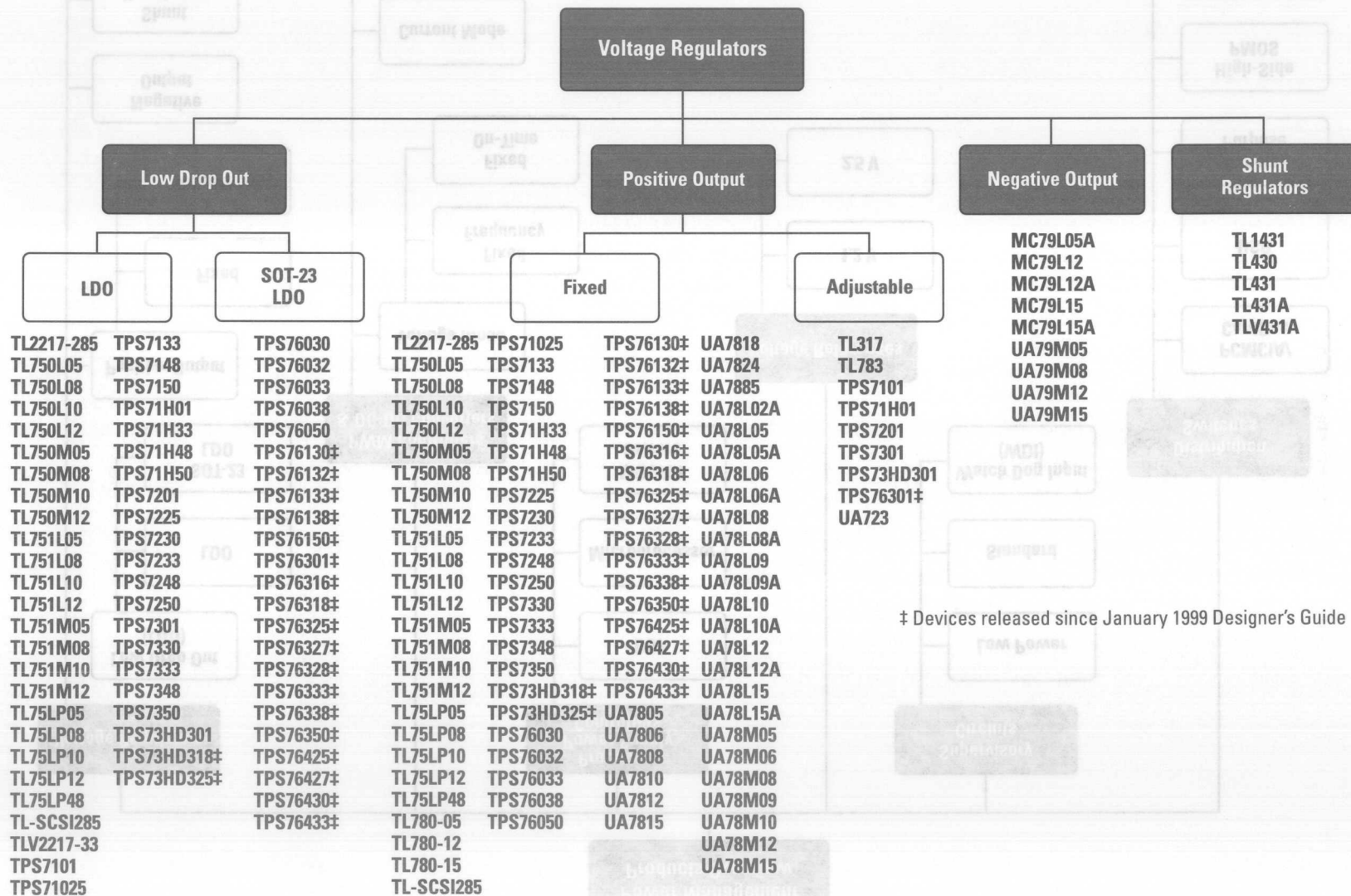
Power Management Products

www.ti.com/sc/docs/products/msp/pwrmgmt/default.htm

Power Management Products Overview



Voltage Regulators



Low Dropout (LDO) Voltage Regulators

Device	V _O Fixed (V) typ	V _O Adjustable (V) typ	I _O (mA) max	V _{do} (V)		I _q (mA) typ	Tol (%) max	V _{IN} (V) max	Shutdown	SVS	Description
				typ	max						
TPS73HD318†	1.8	1.2 to 9.75	750	0.353		0.55	2	10	Yes	Yes	Dual Output (1.8 V, 3.3 V) Low-Dropout
TPS7225	2.5		250			0.180	2	10	Yes	No	Micropower, Very Low Dropout, Adjustable
TPS71025	2.5		500	0.330	0.500	0.290	2	10	Yes	No	Low Dropout
TPS73HD325†	2.5		750	0.353		0.55	2	10	Yes	Yes	Dual Output (2.5 V, 3.3 V) Low-Dropout
TL-SCSI285	2.85		500		0.7	26	1	5.5	No	No	Fixed, for SCSI Termination
TL2217-285	2.85		500		1	26	1.5	5.5	No	No	Fixed, for SCSI Termination
TPS7230	3.0		250	0.390	0.900	0.180	2	10	Yes	No	Micropower, Very Low Dropout, Adjustable
TPS7330	3.0		500	0.052	0.075	0.34	2	10	Yes	Yes	Integrated SVS
TPS7233	3.3		250	0.14	0.18	0.155	2	10	Yes	No	Micropower, Very Low Dropout
TLV2217-33	3.3		500	0.4	0.5	19	1	12	No	No	Low Dropout, 3.3-V, Fixed
TPS7133	3.3		500	0.047	0.06	0.285	2	10	Yes	No	Lowest Dropout
TPS71H33	3.3		500	0.047	0.060	0.285	2	10	Yes	No	High Power Package
TPS7333	3.3		500	0.044	0.06	0.34	2	10	Yes	Yes	Integrated SVS
TPS73HD301	3.3		750	0.353	0.600	1.1	3	10	Yes	Yes	Dual-Output LDO
TPS7248	4.85		250	0.09	0.1	0.155	2	10	Yes	No	Micropower, Very Low Dropout
TL75LP48	4.85		300	0.12	0.2	4	2	23	Yes	No	Low Dropout
TPS7348	4.85		500	0.028	0.037	0.34	2	10	Yes	Yes	Integrated SVS
TPS7148	4.85		500	0.030	0.037	0.285	2	10	Yes	No	Lowest Dropout
TPS71H48	4.85		500	0.030	0.037	0.285	2	10	Yes	No	High Power Package
TL750L05	5.0		150	0.2	0.6	10	4	26	No	No	Low Dropout, Low Current
TL751L05	5.0	150	0.2	0.6	10	4	26	Yes	No	Low Dropout, Low Current, with Shutdown	
TPS7250	5.0	250	0.76	0.85	0.155	2	10	Yes	No	Micropower, Very Low Dropout	
TL75LP05	5.0	300	0.12	0.2	4	2	23	Yes	No	Low Dropout	
TPS7150	5.0	500	0.027	0.032	0.285	2	10	Yes	No	Lowest Dropout	
TPS71H50	5.0	500	0.027	0.033	0.285	2	10	Yes	No	High Power Package	
TPS7350	5.0	500	0.027	0.035	0.34	2	10	Yes	Yes	Integrated SVS	
TL750M05	5.0	750	0.5	0.06	60	2	26	No	No	Low Dropout, High Current	
TL751M05	5.0	750	0.5	0.06	60	2	26	Yes	No	Low Dropout, High Current, with Shutdown	
TL750L08	8.0	150	0.2	0.7	10	4	26	No	No	Low Dropout, Low Current	
TL751L08	8.0	150	0.2	0.7	10	4	26	Yes	No	Low Dropout, Low Current, with Shutdown	
TL75LP08	8.0	300	0.12	0.2	4	2	23	Yes	No	Low Dropout	
TL750M08	8.0	750	0.5	0.7	60	2	26	No	No	Low Dropout, High Current	

† Devices released since January 1999 Designer's Guide

Low Dropout (LDO) Voltage Regulators (Continued)

Low Dropout (LDO) Voltage Regulators (Continued)

Device	V _O Fixed (V) typ	V _O Adjustable (V) typ	I _O (mA) max	V _{do} (V) typ	V _{do} (V) max	I _q (mA) typ	Tol (%) max	V _{IN} (V) max	Shutdown	SVS	Description
TL751M08	8.0		750	0.5	0.7	60	2	26	Yes	No	Low Dropout, High Current, with Shutdown
TL750L10	10.0		150	0.2	0.8	10	4	26	No	No	Low Dropout, Low Current
TL751L10	10.0		150	0.2	0.8	10	4	26	Yes	No	Low Dropout, Low Current, with Shutdown
TL75LP10	10.0		300	0.12	0.2	4	2	23	Yes	No	Low Dropout
TL750M10	10.0		750	0.5	0.8	60	2	26	No	No	Low Dropout, High Current
TL751M10	10.0		750	0.5	0.8	60	2	26	Yes	No	Low Dropout, High Current, with Shutdown
TL750L12	12.0		150	0.2	0.9	10	4	26	No	No	Low Dropout, Low Current
TL751L12	12.0		150	0.2	0.9	10	4	26	Yes	No	Low Dropout, Low Current, with Shutdown
TL75LP12	12.0		300	0.12	0.2	4	2	23	Yes	No	Low Dropout
TL750M12	12.0		750	0.5	0.9	60	2	26	No	No	Low Dropout, High Current
TL751M12	12.0		750	0.5	0.9	60	2	26	Yes	No	Low Dropout, High Current, with Shutdown
TPS7201		1.2 to 9.75	250	0.16	0.27	0.155	3	10	Yes	No	Micropower, Very Low Dropout, Adjustable
TPS7101		1.2 to 9.75	500	0.052	0.085	0.285	3	10	Yes	No	Lowest Dropout, Adjustable
TPS71H01		1.2 to 9.75	500	0.052	0.085	0.285	3	10	Yes	No	High Power Package
TPS7301		1.2 to 9.75	500	0.052	0.085	0.34	3	10	Yes	Yes	Integrated SVS

SOT-23 Low Dropout (LDO) Voltage Regulators

Device	V _O (V)	I _O (mA)	V _{do} (V)		I _q (mA)	Tol (%)		V _{IN} (V)	Shutdown	Description
	typ	max	typ	max	typ	max	max	max		
TPS76316†	1.6	150	0.36	0.60	0.085	4.0	10	10	Yes	Low-Power 150-mA
TPS76318†	1.8	150	0.30	0.50	0.085	3.7	10	10	Yes	Low-Power 150-mA
TPS76325†	2.5	150	0.36	0.60	0.085	3.7	10	10	Yes	Low-Power 150-mA
TPS76425†	2.5	150	0.36	0.60	0.085	3.7	10	10	Yes	Low-Power 150-mA
TPS76427†	2.7	150	0.36	0.60	0.085	3.7	10	10	Yes	Low-Power 150-mA
TPS76030	3.0	50	0.120	0.180	0.850	2.3	16	16	Yes	Low-Power 50-mA
TPS76130†	3.0	100	0.17	0.28	2.600	3.6	16	16	Yes	Low-Power 100-mA
TPS76430†	3.0	150	0.36	0.60	0.085	3.8	10	10	Yes	Low-Power 150-mA
TPS76032	3.2	50	0.120	0.180	0.850	3.1	16	16	Yes	Low-Power 50-mA
TPS76132†	3.2	100	0.17	0.28	2.600	3.0	16	16	Yes	Low-Power 100-mA
TPS76033	3.3	50	0.120	0.180	0.850	3.0	16	16	Yes	Low-Power 50-mA
TPS76133†	3.3	100	0.17	0.28	2.600	3.0	16	16	Yes	Low-Power 100-mA
TPS76333†	3.3	150	0.30	0.50	0.085	3.7	10	10	Yes	Low-Power 150-mA
TPS76433†	3.3	150	0.30	0.50	0.085	3.7	10	10	Yes	Low-Power 150-mA
TPS76038	3.8	50	0.120	0.180	0.850	2.6	16	16	Yes	Low-Power 50-mA
TPS76138†	3.8	100	0.17	0.28	2.600	3.0	16	16	Yes	Low-Power 100-mA
TPS76338†	3.8	150	0.36	0.60	0.085	3.5	10	10	Yes	Low-Power 150-mA
TPS76050	5.0	50	0.120	0.180	0.850	2.0	16	16	Yes	Low-Power 50-mA
TPS76150†	5.0	100	0.17	0.28	2.600	2.8	16	16	Yes	Low-Power 100-mA
TPS76350†	5.0	150	0.18	0.30	0.085	4.0	10	10	Yes	Low-Power 150-mA
TPS76301†	2.7 to 10	150	0.60	0.60	0.085	3.0	10	10	Yes	Low-Power 150-mA

† Devices released since January 1999 Designer's Guide

Fixed Positive-Output Voltage Regulators

Fixed Positive-Output Voltage Regulators

Device	V _O (V) typ	V _O Adjustable (V) typ	V _{IN} (V) max	I _O (mA) max	I _q (mA) typ	Tol (%) max	V _{do} (V) typ	max	Shutdown	SVS	Description
TPS76316‡	1.6		10	150	0.085	4.0	0.360	0.60	Yes	No	Low-Power 150-mA, Low Dropout
TPS76318‡	1.8		10	150	0.085	3.7	0.300	0.50	Yes	No	Low-Power 150-mA, Low Dropout
TPS73HD318‡	1.8		10	750	0.550	2.0	0.353		Yes	Yes	Dual Output (1.8 V, 3.3 V), Low Dropout
UA78L02A	2.00		20	100	3.6	5	1.7	3	No	No	General Purpose, Low Current
TPS76325‡	2.5		10	150	0.085	3.7	0.360	0.60	Yes	No	Low-Power 150-mA, Low Dropout
TPS76425‡	2.5		10	150	0.085	3.7	0.360	0.60	Yes	No	Low-Power 150-mA, Low Dropout
TPS7225	2.50		10	250	0.180	2	0.560	1.1	Yes	No	Micropower, Very Low Dropout
TPS71025	2.50		10	500	0.290	2	0.330	0.500	Yes	No	Low Dropout
TPS73HD325‡	2.5		10	750	0.550	2.0	0.353		Yes	Yes	Dual Output (2.5 V, 3.3 V), Low Dropout
TPS76427‡	2.7		10	150	0.085	3.7	0.360	0.60	Yes	No	Low-Power 150-mA, Low Dropout
TL-SCSI285	2.85		5.5	500	26	1		0.7	No	No	Fixed, for SCSI Active Termination
TL2217-285	2.85		5.5	500	26	1.5		1	No	No	Fixed, for SCSI Active Termination
TPS76030‡	3.0		16	50	0.850	2.3	0.120	0.180	Yes	No	Low-Power 50-mA
TPS76130‡	3.0		16	100	2.600	3.6	0.170	0.28	Yes	No	Low-Power 100-mA, Low Dropout
TPS76430‡	3.0		10	150	0.085	3.8	0.360	0.60	Yes	No	Low-Power 150-mA, Low Dropout
TPS7230	3.0		10	250	0.180	2	0.390	0.900	Yes	No	Micropower, Very Low Dropout
TPS7330	3.0		10	500	0.34	2	0.052	0.075	Yes	Yes	Low Dropout with Integrated SVS
TPS76032	3.20		16	50	0.850	3.1	0.120	0.180	Yes	No	Low-Power 50-mA
TPS76132‡	3.2		16	100	2.600	3.0	0.170	0.28	Yes	No	Low-Power 100-mA, Low Dropout
TPS76033	3.30		16	50	0.850	3.0	0.120	0.180	Yes	No	Low-Power 50-mA
TPS76133‡	3.3		16	100	2.600	3.0	0.170	0.28	Yes	No	Low-Power 100-mA, Low Dropout
TPS76333‡	3.3		10	150	0.085	3.7	0.300	0.50	Yes	No	Low-Power 150-mA, Low Dropout
TPS76433‡	3.3		10	150	0.085	3.7	0.300	0.50	Yes	No	Low-Power 150-mA, Low Dropout
TPS7233	3.30		10	250	0.155	2	0.14	0.18	Yes	No	Micropower, Very Low Dropout
TPS7133	3.30		10	500	0.285	2	0.047	0.06	Yes	No	Lowest Dropout
TPS71H33	3.30		10	500	0.285	2	0.047	0.060	Yes	No	
TPS7333	3.30		10	500	0.34	2	0.044	0.06	Yes	Yes	Lowest Dropout PMOS with Integrated SVS
TPS73HD301	3.30	1.2 to 9.75	10	750	1.1	3	0.353	0.600	Yes	Yes	Dual Output
TPS76038	3.80		16	50	0.850	2.6	0.120	0.180	Yes	No	Low-Power 50-mA
TPS76138‡	3.8		16	100	2.600	3.0	0.170	0.28	Yes	No	Low-Power 100-mA, Low Dropout
TPS76338‡	3.8		10	150	0.085	3.5	0.360	0.60	Yes	No	Low-Power 150-mA, Low Dropout
TPS7248	4.85		10	250	0.155	2	0.09	0.1	Yes	No	Micropower Very Low Dropout
TL75LP48	4.85		23	300	4	2	0.12	0.2	Yes	No	Low Dropout
TPS7148	4.85		10	500	0.285	2	0.030	0.037	Yes	No	Lowest Dropout
TPS71H48	4.85		10	500	0.285	2	0.030	0.037	Yes	No	
TPS7348	4.85		10	500	0.34	2	0.028	0.037	Yes	Yes	Lowest Dropout PMOS with Integrated SVS

‡ Devices released since January 1999 Designer's Guide

Fixed Positive-Output Voltage Regulators (Continued)

Device	V _O (V) typ	V _O Adjustable (V) typ	V _{IN} (V) max	I _O (mA) max	I _q (mA) typ	Tol (%) max	V _{do} (V) typ	max	Shutdown	SVS	Description
TPS76050	5.0		16	50	0.850	2.0	0.120	0.180	Yes	No	Low-Power 50-mA
TPS76150‡	5.0		16	100	2.600	2.8	0.170	0.28	Yes	No	Low-Power 100-mA, Low Dropout
UA78L05	5.0		20	100	3.8	10	2	3	No	No	General Purpose, Low Current
UA78L05A	5.0		20	100	3.8	5	1.7	3	No	No	General Purpose, Low Current
TPS76350‡	5.0		10	150	0.085	4.0	0.180	0.30	Yes	No	Low-Power 150-mA, Low Dropout
TL750L05	5.0		26	150	10	4	0.2	0.6	No	No	Low Dropout, Low Current
TL751L05	5.0		26	150	10	4	0.2	0.6	Yes	No	Low Dropout, Low Current with Shutdown
TPS7250	5.0		10	250	0.155	2	0.76	0.85	Yes	No	Micropower Very Low Dropout
TL75LP05	5.0		23	300	4	2	0.12	0.2	Yes	No	Low Dropout
TPS7150	5.0		10	500	0.285	2	0.027	0.033	Yes	No	Lowest Dropout
TPS71H50	5.0		10	500	0.285	2	0.027	0.033	Yes	No	Lowest Dropout PMOS with Integrated SVS
TPS7350	5.0		10	500	0.34	2	0.027	0.035	Yes	Yes	Lowest Dropout PMOS with Integrated SVS
UA78M05	5.0		25	500	4.5	4	2	3	No	No	General Purpose, Medium Current
TL750M05	5.0		26	750	60	2	0.5	0.6	No	No	Low Dropout, High Current
TL751M05	5.0		26	750	60	2	0.5	0.6	Yes	No	Low Dropout, High Current, with Shutdown
TL780-05	5.0		25	1500	5	1	2	3	No	No	High Current Upgrade for UA7805
UA7805	5.0		25	1500	4.2	4	2	3	No	No	General Purpose, High Current
UA78L06A	6.0		20	100	3.9	5	1.7	3	No	No	General Purpose, Low Current
UA78L06	6.0		20	100	3.9	10	1.7	3	No	No	General Purpose, Low Current
UA78M06	6.0		25	500	4.5	4	2	3	No	No	General Purpose, Medium Current
UA7806	6.0		25	1500	4.3	4	2	3	No	No	General Purpose, High Current
UA78L08	8.0		23	100	4	10	1.7	3	No	No	General Purpose, Low Current
UA78L08A	8.0		23	100	4	5	1.7	3	No	No	General Purpose, Low Current
TL750L08	8.0		26	150	10	4	0.2	0.7	No	No	Low Dropout, Low Current
TL751L08	8.0		26	150	10	4	0.2	0.7	Yes	No	Low Dropout, Low Current with Shutdown
TL75LP08	8.0		23	300	4	2	0.12	0.2	Yes	No	Low Dropout
UA78M08	8.0		25	500	4.6	4	2.5	3	No	No	General Purpose, Medium Current
TL750M08	8.0		26	750	60	2	0.5	0.7	No	No	Low Dropout, High Current
TL751M08	8.0		26	750	60	2	0.5	0.7	Yes	No	Low Dropout, High Current with Shutdown
UA7808	8.0		25	1500	4.3	4	2.5	3	No	No	General Purpose, High Current
UA7885	8.0		25	1500	4.3	4	2	3	No	No	General Purpose, High Current
UA78L09A	9.0		24	100	4.1	5	1.7	3	No	No	General Purpose, Low Current
UA78L09	9.0		24	100	4.1	10	1.7	3	No	No	General Purpose, Low Current
UA78M09	9.0		26	500	4.6	4	2.5	3	No	No	General Purpose, Medium Current
UA78L10A	10.0		25	100	4.2	5	1.7	3	No	No	General Purpose, Low Current
UA78L10	10.0		25	100	4.2	10	1.7	3	No	No	General Purpose, Low Current

‡ Devices released since January 1999 Designer's Guide

Fixed Positive-Output Voltage Regulators (Continued)

Device	V _O (V) typ	V _O Adjustable (V) typ	V _{IN} (V) max	I _O (mA) max	I _q (mA) typ	Tol (%) max	V _{do} (V) typ	max	Shutdown	SVS	Description
TL750L10	10.0		26	150	10	4	0.2	0.8	No	No	Low Dropout, Low Current
TL751L10	10.0		26	150	10	4	0.2	0.8	Yes	No	Low Dropout, Low Current with Shutdown
TL75LP10	10.0		23	300	4	2	0.12	0.2	Yes	No	Low Dropout
UA78M10	10.0		28	500	4.6	4	2.5	3	No	No	General Purpose, Medium Current
TL750M10	10.0		26	750	60	2	0.5	0.8	No	No	Low Dropout, High Current
TL751M10	10.0		26	750	60	2	0.5	0.8	Yes	No	Low Dropout, High Current with Shutdown
UA7810	10.0		28	1500	4.3	4	2.5	3	No	No	General Purpose, High Current
UA78L12	12.0		27	100	4.3	10	1.7	3	No	No	General Purpose, Low Current
UA78L12A	12.0		27	100	4.3	5	1.7	3	No	No	General Purpose, Low Current
TL750L12	12.0		26	150	10	4	0.2	0.9	No	No	Low Dropout, Low Current
TL751L12	12.0		26	150	10	4	0.2	0.9	Yes	No	Low Dropout, Low Current with Shutdown
TL75LP12	12.0		23	300	4	2	0.12	0.2	Yes	No	Low Dropout
UA78M12	12.0		30	500	4.8	4	2.5	3	No	No	General Purpose, Medium Current
TL750M12	12.0		26	750	60	2	0.5	0.9	No	No	Low Dropout, High Current
TL751M12	12.0		26	750	60	2	0.5	0.9	Yes	No	Low Dropout, High Current with Shutdown
TL780-12	12.0		30	1500	5.5	1	2.5	3	No	No	High Current Upgrade for UA7812
UA7812	12.0		30	1500	4.3	4	2.5	3	No	No	General Purpose, High Current
UA78L15	15.0		30	100	4.6	10	1.7	3	No	No	General Purpose, Low Current
UA78L15A	15.0		30	100	4.6	5	1.7	3	No	No	General Purpose, Low Current
UA78M15	15.0		30	500	4.8	4	2.5	3	No	No	General Purpose, Medium Current
TL780-15	15.0		30	1500	5.5	1	2.5	3	No	No	High Current Upgrade for UA7815
UA7815	15.0		30	1500	4.4	4	2.5	3	No	No	General Purpose, High Current
UA7818	18.0		33	1500	4.5	4	3	3	No	No	General Purpose, High Current
UA7824	24.0		38	1500	4.6	4	3	3	No	No	General Purpose, High Current

Adjustable Positive-Output Voltage Regulators

Device	V _O Range (V)	V _{IN} (V)	I _O (mA)	I _q (mA)	Tol (%)	V _{do} (V)		Shutdown	SVS	Description
	max	max	max	typ	max	typ	max			
TPS76301‡	1.2 to 6.5	10	150	0.085	3	0.6	0.6	Yes	No	Micropower, Very Low Dropout Lowest Dropout High Power Package
TPS7201	1.2 to 9.75	10	250	0.155	3	0.16	0.27	Yes	No	
TPS7101	1.2 to 9.75	10	500	0.285	3	0.052	0.085	Yes	No	
TPS71H01	1.2 to 9.75	10	500	0.285	3	0.052	0.085	Yes	No	Integrated SVS
TPS7301	1.2 to 9.75	10	500	0.34	3	0.052	0.085	Yes	Yes	Dual-Output
TPS73HD301	1.2 to 9.75	10	750	1.1	3	0.353	0.600	Yes	Yes	General Purpose, Low Current, 3-Terminal
TL317	1.2 to 32.0	35	100	1.5	4	2.5	3	No	No	Precision
UA723	2 to 37	40	150	2.3	1		3	No	No	High Voltage, High Current
TL783	1.25 to 125.0	125	700	15	6	10	15	No	No	

‡ Devices released since January 1999 Designer's Guide

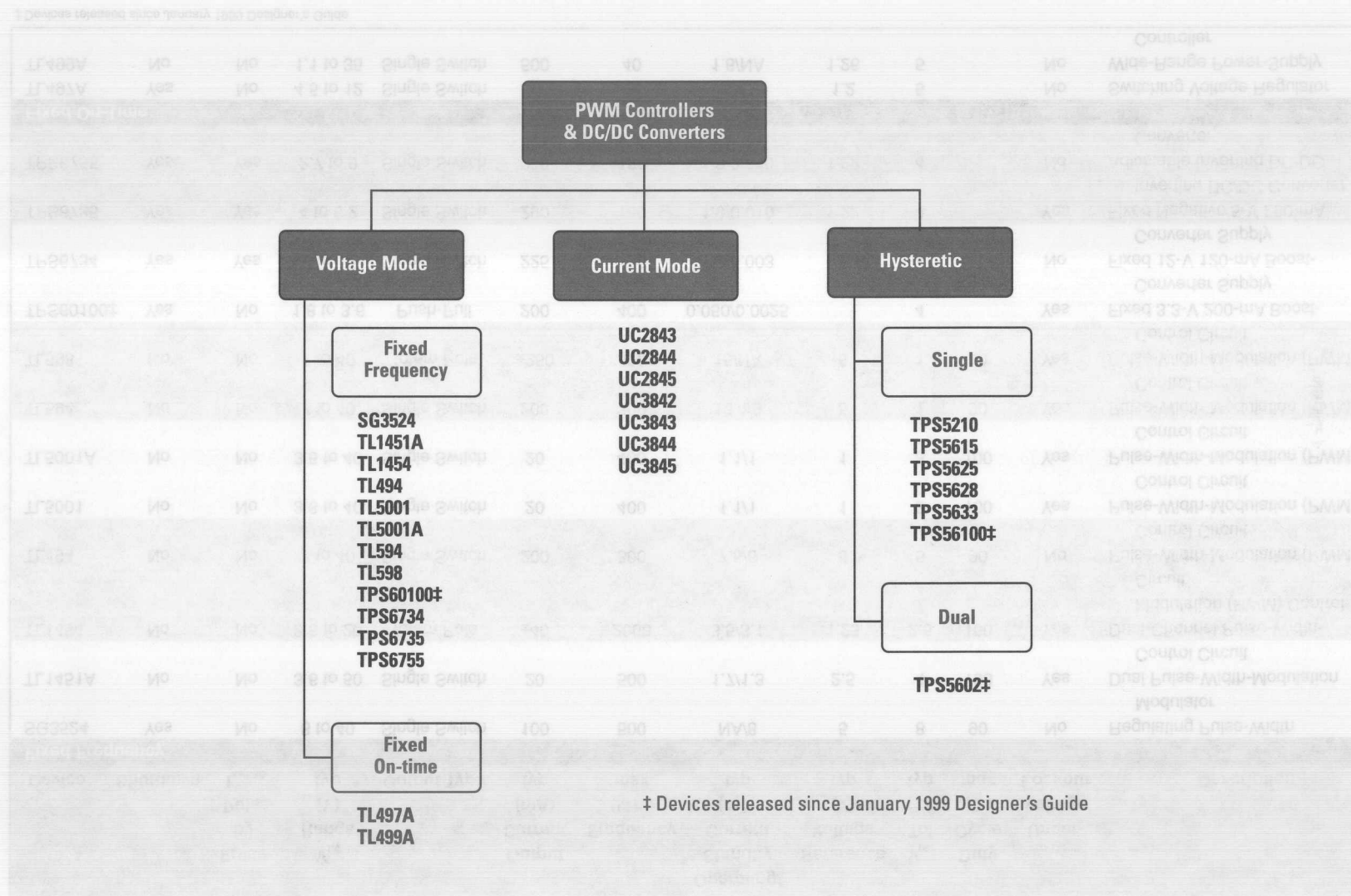
Fixed Negative-Output Voltage Regulators

Device	V_O (V)	V_{IN} (V)	I_O (mA)	I_q (mA)	Tol (%)	V_{do} (V)		Description
	typ	max	max	typ	max	typ	max	
MC79L05A	-5.0	-20	100	5	5	2	3	Low Current
UA79M05	-5.0	-25	500	1	4	2	3	General Purpose, Medium Current
UA79M08	-8.0	-25	500	1	4	2.5	3	General Purpose, Medium Current
MC79L12A	-12.0	-27	100	5	5	2.5	3	Low Current
MC79L12	-12.0	-27	100	10	10	2.5	3	Low Current
UA79M12	-12.0	-30	500	1.5	4	2.5	3	General Purpose, Medium Current
MC79L15A	-15.0	-30	100	5	5	2.5	3	Low Current
MC79L15	-15.0	-30	100	10	10	2.5	3	Low Current
UA79M15	-15.0	-30	500	1.5	4	2.5	3	General Purpose, Medium Current

Shunt Voltage Regulators

Device	V_{ref} (V)	I_z (μ A)	I_z (mA)	V_O (V)		Tol (%)	V_{IN} (V)	Temp Coeff (ppm/ $^{\circ}$ C)	Description
	typ	min	max	min	max	max	max	typ	
TLV431A	1.24	100	15	V_{ref}	6	1	6	46	Low Voltage, Adjustable, Precision
TL1431	2.5	1000	100	V_{ref}	36	0.4	36	30	Precision, Adjustable (Programmable)
TL431	2.5	1000	100	V_{ref}	36	2	36	30	Adjustable, Precision
TL431A	2.5	1000	100	V_{ref}	36	1	36	30	Adjustable, Precision
TL430	2.75	2000	100	V_{ref}	30	9	30	120	Adjustable

PWM Controllers & DC/DC Converters



Voltage Mode PWM Controllers & DC/DC Converters

Voltage Mode PWM Controllers & DC/DC Converters

Device	Shutdown	Pulse-by-Pulse I_{sense}	V_{IN} Range (V) typ	Output Type	Output Current (mA) typ	Frequency (kHz) max	Operating/ Standby Current (mA) typ	Reference Voltage (V) typ	V_{ref} Tol (%) typ	Duty Cycle (%) max	Under- voltage Lockout	Description
Fixed Frequency												
SG3524	Yes	No	8 to 40	Single Switch	100	500	NA/8	5	8	90	No	Regulating Pulse-Width Modulator
TL1451A	No	No	3.6 to 50	Single Switch	20	500	1.7/1.3	2.5	4	100	Yes	Dual Pulse-Width-Modulation Control Circuit
TL1454	No	No	3.6 to 20	Totem Pole	±40	2000	3.5/3.1	1.25	2.5	100	Yes	Dual-Channel Pulse-Width-Modulation (PWM) Control Circuit
TL494	No	No	7 to 40	Single Switch	200	300	7.5/6	5	5	90	No	Pulse-Width-Modulation (PWM) Control Circuit
TL5001	No	No	3.6 to 40	Single Switch	20	400	1.1/1	1	5	100	Yes	Pulse-Width-Modulation (PWM) Control Circuit
TL5001A	No	No	3.6 to 40	Single Switch	20	400	1.1/1	1	3	100	Yes	Pulse-Width-Modulation (PWM) Control Circuit
TL594	No	No	7 to 40	Single Switch	200	300	12.4/9	5	1	90	Yes	Pulse-Width-Modulation (PWM) Control Circuit
TL598	No	No	7 to 40	Totem Pole	±250	300	15/NA	5	1	90	Yes	Pulse-Width-Modulation (PWM) Control Circuit
TPS60100†	Yes	No	1.8 to 3.6	Push-Pull	200	400	0.050/0.0025		4		Yes	Fixed 3.3-V 200-mA Boost-Converter Supply
TPS6734	Yes	Yes	5 to 12	Single Switch	225	170	1.2/0.003	1.23	4		No	Fixed 12-V 120-mA Boost-Converter Supply
TPS6735	Yes	Yes	4 to 6.2	Single Switch	200	160	1.9/0.010	1.22	4		Yes	Fixed Negative 5-V 200-mA Inverting DC/DC Converter
TPS6755	Yes	Yes	2.7 to 9	Single Switch	200	160	1.9/0.010	1.22	4		No	Adjustable Inverting DC/DC Converter
Fixed On-Time												
TL497A	Yes	No	4.5 to 12	Single Switch	500	50	11/6	1.2	5		No	Switching Voltage Regulator
TL499A	No	No	1.1 to 35	Single Switch	500	40	1.8/NA	1.26	5		No	Wide-Range Power-Supply Controller

† Devices released since January 1999 Designer's Guide

Current Mode PWM Controllers & DC/DC Converters

Device	Shutdown	Pulse-by-Pulse I_{sense}	V_{IN} Range (V) typ	Output Type	Output Current (mA) typ	Frequency (kHz) max	Operating/ Standby Current (mA) typ	Reference Voltage (V) typ	V_{ref} Tol (%) typ	Duty Cycle (%) max	Under- voltage Lockout	Description
UC2843	No	Yes	30	Totem Pole	±200	500	11/NA	5	1	97	Yes	Current-Mode PWM Controller
UC2844	No	Yes	30	Totem Pole	±200	500	11/NA	5	1	97	Yes	Current-Mode PWM Controller
UC2845	No	Yes	30	Totem Pole	±200	500	11/NA	5	1	97	Yes	Current-Mode PWM Controller
UC3842	No	Yes	30	Totem Pole	±200	500	11/NA	5	2	97	Yes	Current-Mode PWM Controller
UC3843	No	Yes	30	Totem Pole	±200	500	11/NA	5	2	97	Yes	Current-Mode PWM Controller
UC3844	No	Yes	30	Totem Pole	±200	500	11/NA	5	2	97	Yes	Current-Mode PWM Controller
UC3845	No	Yes	30	Totem Pole	±200	500	11/NA	5	2	97	Yes	Current-Mode PWM Controller

Hysteretic PWM Controllers & DC/DC Converters

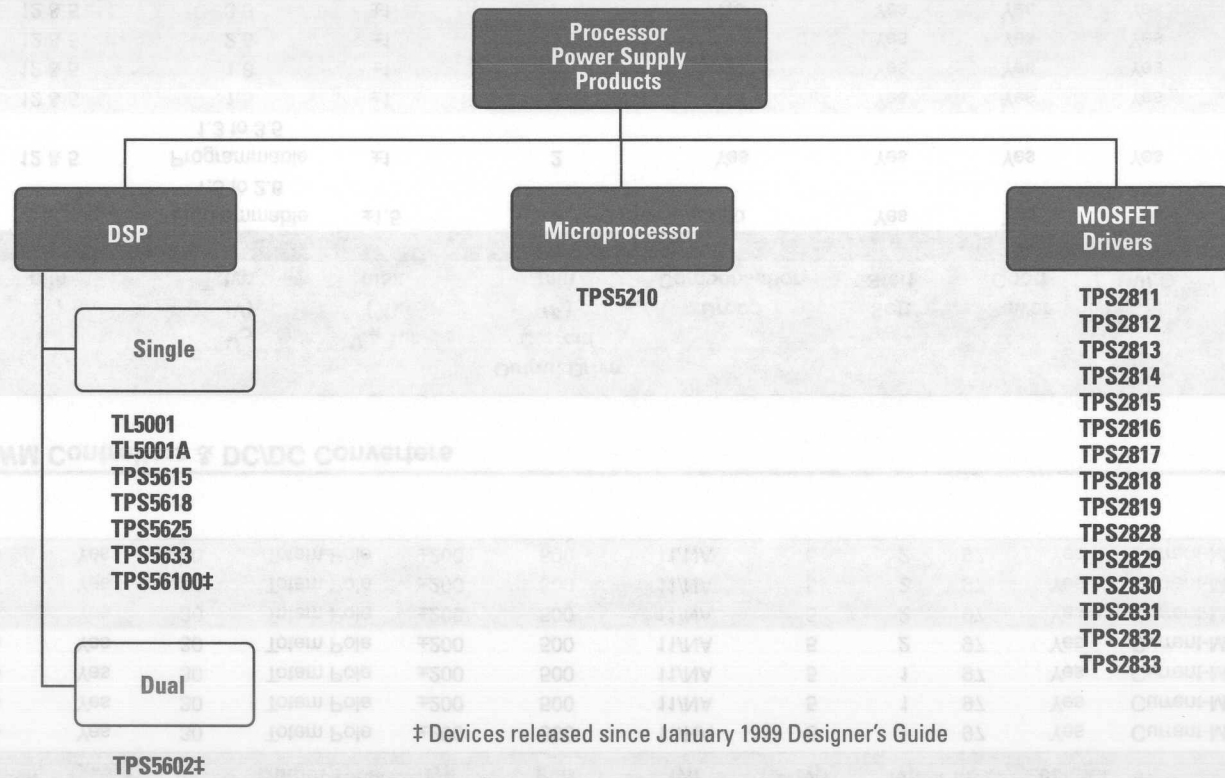
Device	V_{IN} (V) min	V_O (V) typ	V_{ref} Tol (%) max	Output Drive Current (A) min	Droop Compensation	Soft Start	Power Good	UVLO	OVP	OCP
Single										
TPS56100‡	5	Programmable 1.3 to 2.6	±1.5	2	No	Yes	Yes	Yes	Yes	Yes
TPS5210	12 & 5	Programmable 1.3 to 3.5	±1	2	Yes	Yes	Yes	Yes	Yes	Yes
TPS5615	12 & 5	1.5	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS5628	12 & 5	1.8	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS5625	12 & 5	2.5	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS5633	12 & 5	3.3	±1	2	No	Yes	Yes	Yes	Yes	Yes
Dual										
TPS5602‡	4.5 to 25	Dual Adjustable ≥1.2	±1.5	1/Driver	No	Yes	No	Yes	No	Yes

‡ Devices released since January 1999 Designer's Guide

Processor Power Supply Products

Decision Tree

Processor Power Supply Products



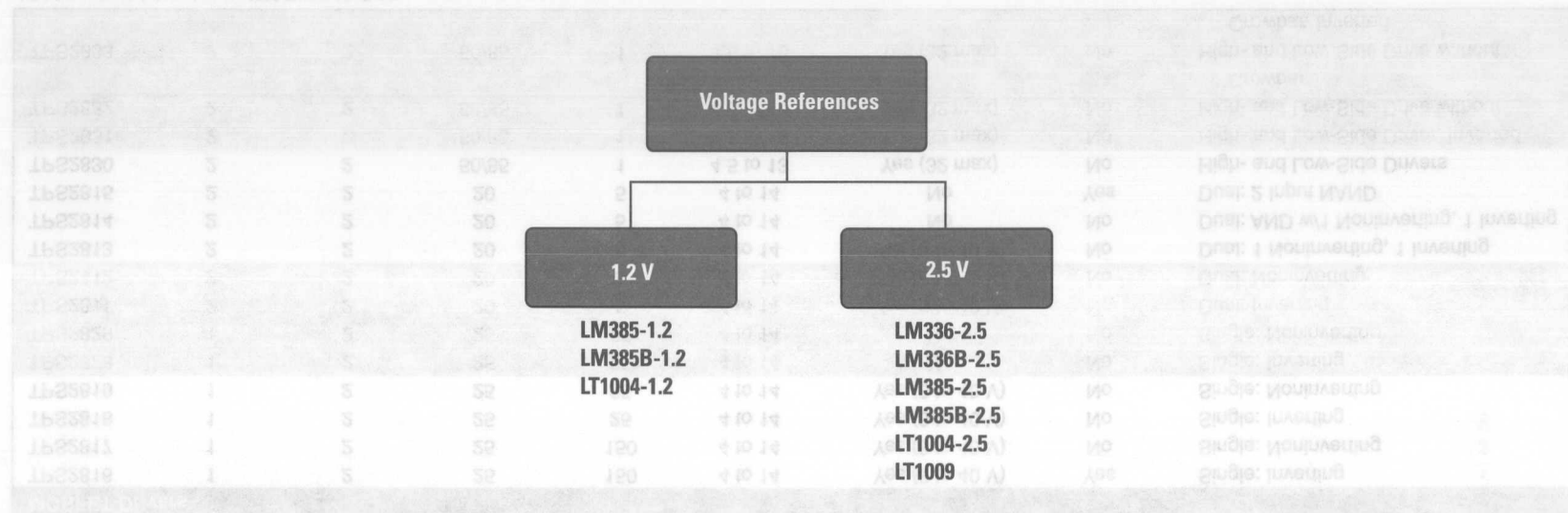
‡ Devices released since January 1999 Designer's Guide

Processor Power Supply Products

Device	V _{IN} (V) min	V _O (V) typ	V _{ref} Tol (%) max	Output Drive Current (A) min	Droop Compensation	Soft Start	Power Good	UVLO	OVP	OCP
DSP—Single										
TL5001	3.6 to 40		5	20	No	No	No	Yes	No	No
TL5001A	3.6 to 40		3	20	No	No	No	Yes	No	No
TPS5615	12 & 5	1.5	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS5618	12 & 5	1.8	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS5625	12 & 5	2.5	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS5633	12 & 5	3.3	±1	2	No	Yes	Yes	Yes	Yes	Yes
TPS56100‡	5	Programmable 1.3 to 2.6	±1.5	2	No	Yes	Yes	Yes	Yes	Yes
DSP—Dual										
TPS5602‡	4.5 to 25	Dual Adjustable ≥1.2	±1.5	1/Driver	No	Yes	No	Yes	No	Yes
Microprocessor										
TPS5210	12 & 5	Programmable 1.3 to 3.5	±1	2	Yes	Yes	Yes	Yes	Yes	Yes
MOSFET Drivers										
TPS2816	1	2	25	150	4 to 14	Yes (8 to 40 V)	Yes	Single: Inverting		
TPS2817	1	2	25	150	4 to 14	Yes (8 to 40 V)	No	Single: Noninverting		
TPS2818	1	2	25	25	4 to 14	Yes (8 to 40 V)	No	Single: Inverting		
TPS2819	1	2	25	25	4 to 14	Yes (8 to 40 V)	No	Single: Noninverting		
TPS2828	1	2	25	25	4 to 14	No	No	Single: Inverting		
TPS2829	1	2	25	25	4 to 14	No	No	Single: Noninverting		
TPS2811	2	2	20	5	4 to 14	Yes (8 to 40 V)	No	Dual: Inverting		
TPS2812	2	2	20	5	4 to 14	Yes (8 to 40 V)	No	Dual: Noninverting		
TPS2813	2	2	20	5	4 to 14	Yes (8 to 40 V)	No	Dual: 1 Noninverting, 1 Inverting		
TPS2814	2	2	20	5	4 to 14	No	No	Dual: AND w/1 Noninverting, 1 Inverting		
TPS2815	2	2	20	5	4 to 14	No	Yes	Dual: 2 Input NAND		
TPS2830	2	2	50/85	1	4.5 to 13	Yes (32 max)	No	High- and Low-Side Drivers		
TPS2831	2	2	50/85	1	4.5 to 13	Yes (32 max)	No	High- and Low-Side Driver, Inverted		
TPS2832	2	2	50/85	1	4.5 to 13	Yes (32 max)	No	High- and Low-Side Drive without Crowbar		
TPS2833	2	2	50/85	1	4.5 to 13	Yes (32 max)	No	High- and Low-Side Drive without Crowbar, Inverted		

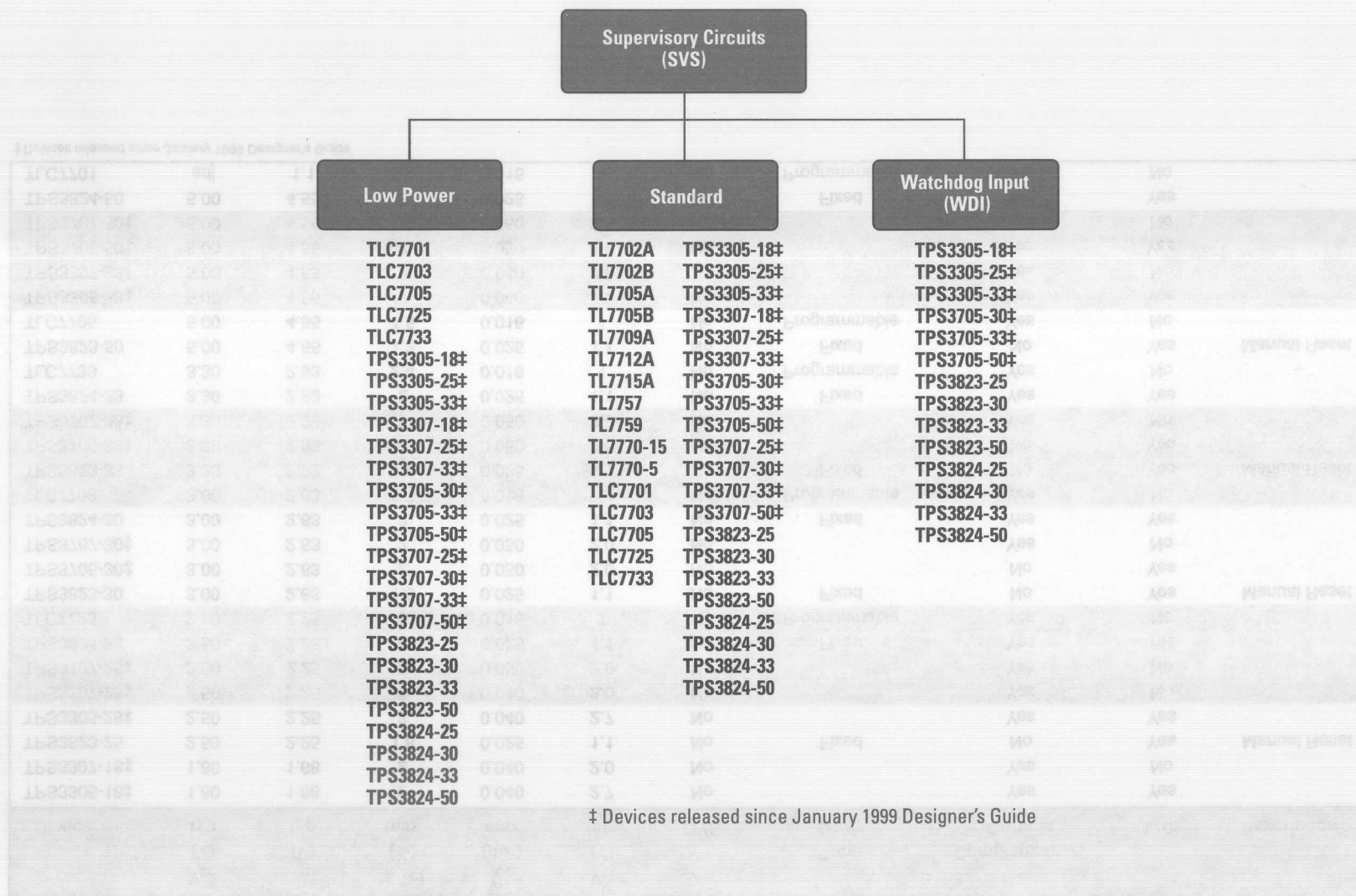
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Voltage References



Device	V _{ref} (V) typ	V _{ref} Tol (%) max	I _z (μA) min	I _z (mA) max	Temp Coeff (ppm/°C) typ	Description
LT1004-1.2	1.2	0.3	10	20	20	Micropower Integrated Precision Voltage Reference
LM385B-1.2	1.2	1	10	20	±20	Micropower Voltage Reference
LM385-1.2	1.2	2	10	20	±20	Micropower Voltage Reference
LT1004-2.5	2.5	0.8	20	20	20	Micropower Integrated Precision Voltage Reference
LM336B-2.5	2.5	1	400	10	N/A	Precision Voltage Reference
LM385B-2.5	2.5	1.5	20	20	±20	Micropower Voltage Reference
LT1009	2.5	2	400	20	15	2.5-V Integrated Reference Circuit
LM385-2.5	2.5	3	20	20	±20	Micropower Voltage Reference
LM336-2.5	2.5	4	400	10	N/A	2.5-V Integrated Reference Circuit

Supervisory Circuits (SVS)



Low Power Supervisory Circuits (SVS)

Device	V _{CC} (V) typ	V _I (V) typ	V _I Tol (%) max	I _{CC} (mA) max	V _{IN} (V) min	OVS	Time Delay	Complementary Outputs	WDI	Description
TPS3305-18‡	1.80	1.68	2	0.040	2.7	No		Yes	Yes	
TPS3307-18‡	1.80	1.68	2	0.040	2.0	No		Yes	No	
TPS3823-25	2.50	2.25	1.8	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3305-25‡	2.50	2.25	2	0.040	2.7	No		Yes	Yes	
TPS3307-25‡	2.50	2.25	2	0.040	2.0	No		Yes	No	
TPS3707-25‡	2.50	2.25	2	0.050	2.0	No		Yes	No	
TPS3824-25	2.50	2.25	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7725	2.50	2.25	3	0.016	1	No	Programmable	Yes	No	
TPS3823-30	3.00	2.63	1.5	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3705-30‡	3.00	2.63	2	0.050	2.0	No		No	Yes	
TPS3707-30‡	3.00	2.63	2	0.050	2.0	No		Yes	No	
TPS3824-30	3.00	2.63	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7703	3.00	2.63	2.7	0.016	1	No	Programmable	Yes	No	
TPS3823-33	3.30	2.93	1.7	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3705-33‡	3.30	2.93	2	0.050	2.0	No		No	Yes	
TPS3707-33‡	3.30	2.93	2	0.050	2.0	No		Yes	No	
TPS3824-33	3.30	2.93	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7733	3.30	2.93	2.4	0.016	1	No	Programmable	Yes	No	
TPS3823-50	5.00	4.55	1.3	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TLC7705	5.00	4.55	1.5	0.016	1	No	Programmable	Yes	No	
TPS3305-33‡	5.00	4.55	2	0.040	2.7	No		Yes	Yes	
TPS3307-33‡	5.00	4.55	2	0.040	2.0	No		Yes	No	
TPS3705-50‡	5.00	4.55	2	0.050	2.0	No		No	Yes	
TPS3707-50‡	5.00	4.55	2	0.050	2.0	No		Yes	No	
TPS3824-50	5.00	4.55	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7701	adj	1.1	5.4	0.016	1	No	Programmable	Yes	No	

‡ Devices released since January 1999 Designer's Guide

Standard Supervisory Circuits (SVS)

Device	Number Of SVS	V _{CC} (V) typ	V _t (V) typ	V _t Tol (%) max	I _{CC} (mA) max	V _{IN} (V) min	OVS	Time Delay	Complementary Outputs	WDI	Description
TPS3305-18‡	2	1.8	1.68	2	0.040	2.7	No		Yes	Yes	
TPS3307-18‡	3	1.8	1.68	2	0.040	2.0	No		Yes	No	
TPS3823-25	1	2.5	2.25	1.8	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3707-25‡	1	2.5	2.25	2	0.050	2.0	No		Yes	No	
TPS3305-25‡	2	2.5	2.25	2	0.040	2.7	No		Yes	Yes	
TPS3307-25‡	3	2.5	2.25	2	0.040	2.0	No		Yes	No	
TPS3824-25	1	2.5	2.25	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7725	1	2.5	2.25	3	0.016	1	No	Programmable	Yes	No	
TPS3823-30	1	3.0	2.63	1.5	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3705-30‡	1	3.0	2.63	2	0.050	2.0	No		No	Yes	
TPS3707-30‡	1	3.0	2.63	2	0.050	2.0	No		Yes	No	
TPS3824-30	1	3.0	2.63	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7703	1	3.0	2.63	2.7	0.016	1	No	Programmable	Yes	No	
TPS3823-33	1	3.3	2.93	1.7	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3705-33‡	1	3.3	2.93	2	0.050	2.0	No		No	Yes	
TPS3707-33‡	1	3.3	2.93	2	0.050	2.0	No		Yes	No	
TPS3824-33	1	3.3	2.93	2	0.025	1.1	No	Fixed	Yes	Yes	
TLC7733	1	3.3	2.93	2.4	0.016	1	No	Programmable	Yes	No	
TL7770-5	2	5.0	4.55	1	5	1	Yes	Programmable	Yes	No	
TPS3823-50	1	5.0	4.55	1.3	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TLC7705	1	5.0	4.55	1.5	0.016	1	No	Programmable	Yes	No	
TPS3705-50‡	1	5.0	4.55	2	0.050	2.0	No		No	Yes	
TPS3707-50‡	1	5.0	4.55	2	0.050	2.0	No		Yes	No	
TPS3305-33‡	2	5.0	4.55	2	0.040	2.7	No		Yes	Yes	
TPS3307-33‡	3	5.0	4.55	2	0.040	2.0	No		Yes	No	
TL7705A	1	5.0	4.55	2	3	3.6	No	Programmable	Yes	No	
TL7705B	1	5.0	4.55	2	3	1	No	Programmable	Yes	No	
TPS3824-50	1	5.0	4.55	2	0.025	1.1	No	Fixed	Yes	Yes	
TL7757	1	5.0	4.55	3	2.5	1	No	No Delay	No	No	3-Terminal
TL7759	1	5.0	4.55	3	2	1	No	No Delay	Yes	No	4-Terminal
TL7709A	1	9.0	7.6	2	3	3.6	No	Programmable	Yes	No	
TL7712A	1	12.0	10.8	2	3	3.6	No	Programmable	Yes	No	

‡ Devices released since January 1999 Designer's Guide

Standard Supervisory Circuits (SVS) (Continued)

Standard Supervisory Circuits (SVS) (Continued)

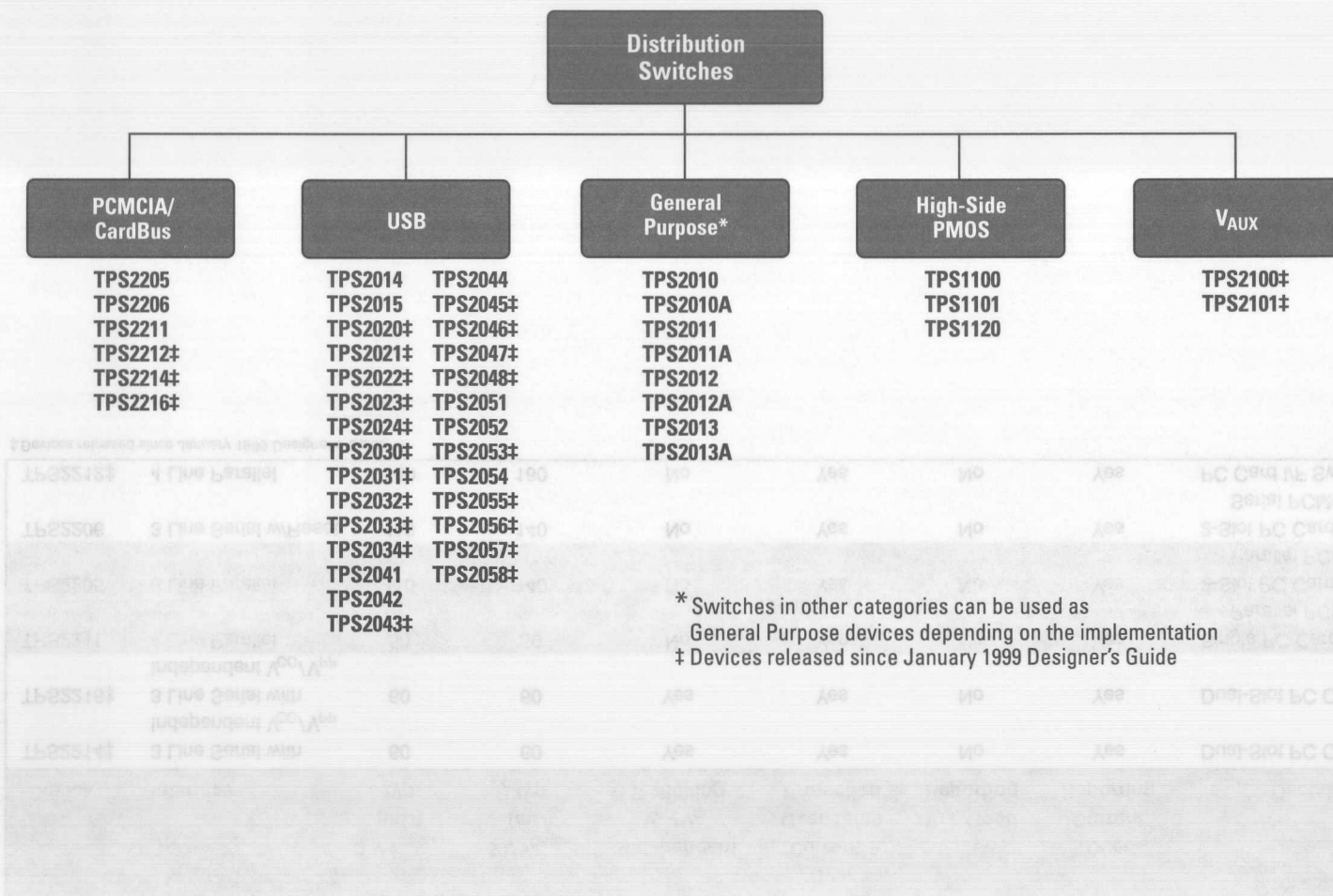
Device	Number Of SVS	V _{CC} (V) typ	V _I (V) typ	V _I Tol (%) max	I _{CC} (mA) max	V _{IN} (V) min	OVS	Time Delay	Complementary Outputs	WDI	Description
TL7770-15	2	15.0	13.64	1	5	1	Yes	Programmable	Yes	No	
TL7715A	1	15.0	13.5	2	3	3.6	No	Programmable	Yes	No	
TLC7701	1	adj	1.1	5.4	0.016	1	No	Programmable	Yes	No	
TL7702A	1	pgm	pgm	2	3	3.6	No	Programmable	Yes	No	
TL7702B	1	pgm	pgm	2	3	1	No	Programmable	Yes	No	

Watchdog Input Supervisory Circuits (SVS)

Device	V _{CC} (V) typ	V _I (V) typ	V _I Tol (%) max	I _{CC} (mA) max	V _{IN} (V) min	OVS	Time Delay	Complementary Outputs	WDI	Description
TPS3305-18‡	1.80	1.68	2	0.040	2.7	No		Yes	Yes	
TPS3823-25	2.50	2.25	1.8	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3305-25‡	2.50	2.25	2	0.040	2.7	No		Yes	Yes	
TPS3824-25	2.50	2.25	2	0.025	1.1	No	Fixed	Yes	Yes	
TPS3823-30	3.00	2.63	1.5	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3705-30‡	3.00	2.63	2	0.050	2.0	No		No	Yes	
TPS3824-30	3.00	2.63	2	0.025	1.1	No	Fixed	Yes	Yes	
TPS3823-33	3.30	2.93	1.7	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3705-33‡	3.30	2.93	2	0.050	2.0	No		No	Yes	
TPS3824-33	3.30	2.93	2	0.025	1.1	No	Fixed	Yes	Yes	
TPS3823-50	5.00	4.55	1.3	0.025	1.1	No	Fixed	No	Yes	Manual Reset
TPS3305-33‡	5.00	4.55	2	0.040	2.7	No		Yes	Yes	
TPS3705-50‡	5.00	4.55	2	0.050	2.0	No		No	Yes	
TPS3824-50	5.00	4.55	2	0.025	1.1	No	Fixed	Yes	Yes	

‡ Devices released since January 1999 Designer's Guide

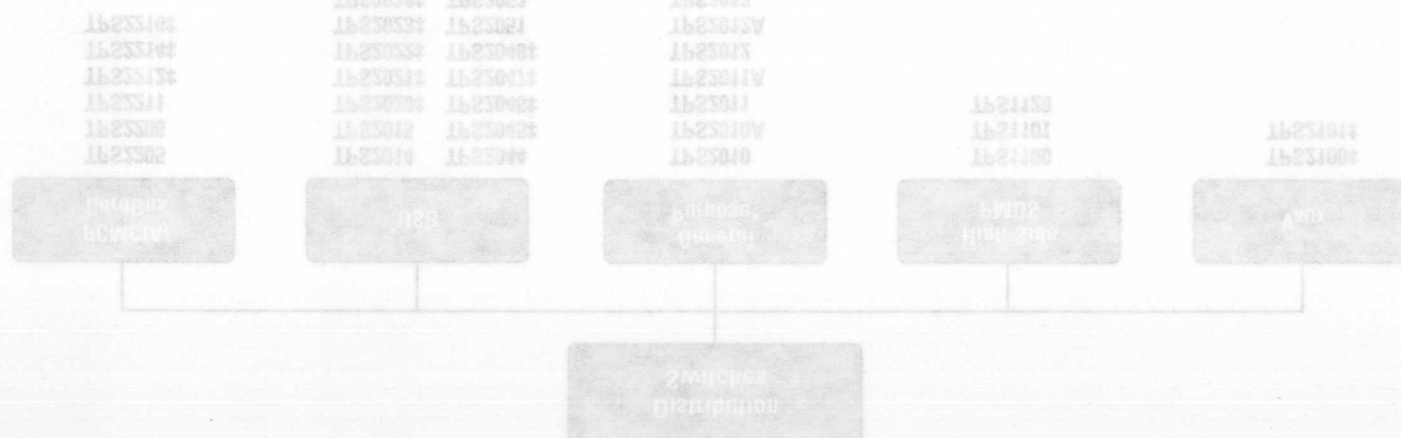
Distribution Switches



PCMCIA/CardBus Distribution Switches

Device	Interface	3 V $r_{DS(on)}$ (m Ω) typ	5 V $r_{DS(on)}$ (m Ω) typ	Independent V_{PP}/V_{CC} Switching	Over Current & Over Temp Protection	V_{PP} _Good Reporting	Over Current Reporting	Description
TPS2214†	3 Line Serial with Independent V_{CC}/V_{PP}	60	60	Yes	Yes	No	Yes	Dual-Slot PC Card Power-I/F Switch
TPS2216†	3 Line Serial with Independent V_{CC}/V_{PP}	60	60	Yes	Yes	No	Yes	Dual-Slot PC Card Power-I/F Switch
TPS2211	4 Line Parallel	50	50	No	Yes	No	Yes	Single PC Card Power-I/F Switch for Parallel PCMCIA Controller
TPS2205	8 Line Parallel	110	140	No	Yes	No	Yes	2-Slot PC Card PWR-I/F Switch for Parallel PCMCIA Controller
TPS2206	3 Line Serial w/Reset	110	140	No	Yes	No	Yes	2-Slot PC Card PWR-I/F Switch for Serial PCMCIA Controller
TPS2212†	4 Line Parallel	160	160	No	Yes	No	Yes	PC Card I/F Switch

† Devices released since January 1999 Designer's Guide



USB Distribution Switches

Device	Number of FETs	$r_{DS(on)}$ (m Ω) typ	Output Current (A) max	Current Limit (A) typ	V_{IN} Range (V) typ	Supply Current (μ A) typ	Over Current Reporting	Over Temp Reporting	Enable	Description
TPS2020†	1	33	0.20	0.3	2.7 to 5.5	73	Yes	Yes	Neg	Power Distribution Switches
TPS2030†	1	33	0.20	0.3	2.7 to 5.5	73	Yes	Yes	Pos	Power Distribution Switches
TPS2045†	1	80	0.25	0.4	2.7 to 5.5	80	Yes	Yes	Neg	Power Distribution Switches
TPS2055†	1	80	0.25	0.4	2.7 to 5.5	80	Yes	Yes	Pos	Power Distribution Switches
TPS2041	1	80	0.5	0.9	2.7 to 5.5	80	Yes	Yes	Neg	USB, GP Power Distribution Switch
TPS2051	1	80	0.5	0.9	2.7 to 5.5	80	Yes	Yes	Pos	USB, GP Power Distribution Switch
TPS2014	1	75	0.6	1.2	4.0 to 5.5	73	Yes	No	Neg	USB, GP Power Distribution Switch
TPS2021†	1	33	0.60	0.9	2.7 to 5.5	73	Yes	Yes	Neg	Power Distribution Switches
TPS2031†	1	33	0.60	0.9	2.7 to 5.5	73	Yes	Yes	Pos	Power Distribution Switches
TPS2015	1	75	1.0	2.0	4.0 to 5.5	73	Yes	No	Neg	USB, GP Power Distribution Switch
TPS2022†	1	33	1.00	1.5	2.7 to 5.5	73	Yes	Yes	Neg	Power Distribution Switches
TPS2032†	1	33	1.00	1.5	2.7 to 5.5	73	Yes	Yes	Pos	Power Distribution Switches
TPS2023†	1	33	1.50	2.2	2.7 to 5.5	73	Yes	Yes	Neg	Power Distribution Switches
TPS2033†	1	33	1.50	2.2	2.7 to 5.5	73	Yes	Yes	Pos	Power Distribution Switches
TPS2024†	1	33	2.00	3.0	2.7 to 5.5	73	Yes	Yes	Neg	Power Distribution Switches
TPS2034†	1	33	2.00	3.0	2.7 to 5.5	73	Yes	Yes	Pos	Power Distribution Switches
TPS2046†	2	80	0.25	0.4	2.7 to 5.5	80	Yes	Yes	Neg	Power Distribution Switches
TPS2056†	2	80	0.25	0.4	2.7 to 5.5	80	Yes	Yes	Pos	Power Distribution Switches
TPS2042	2	80	0.5 ea	0.9 ea	2.7 to 5.5	80	Each	Yes	Neg	Dual USB, GP Power Distribution Switch
TPS2052	2	80	0.5 ea	0.9 ea	2.7 to 5.5	80	Each	Yes	Pos	Dual USB, GP Power Distribution Switch
TPS2047†	3	80	0.25	0.4	2.7 to 5.5	160	Yes	Yes	Neg	Triple Power Distribution Switches
TPS2053†	3	80	0.50	0.9	2.7 to 5.5	160	Each	Yes	Pos	Triple Power Distribution Switches
TPS2057†	3	80	0.25	0.4	2.7 to 5.5	160	Yes	Yes	Pos	Triple Power Distribution Switches
TPS2043†	3	80	0.50	0.9	2.7 to 5.5	160	Each	Yes	Neg	Triple Power Distribution Switches
TPS2048†	4	80	0.25	0.4	2.7 to 5.5	160	Yes	Yes	Neg	Quad Power Distribution Switches
TPS2058†	4	80	0.25	0.4	2.7 to 5.5	160	Yes	Yes	Pos	Quad Power Distribution Switches
TPS2044	4	80	0.5 ea	0.9 ea	2.7 to 5.5	160	Each	Yes	Neg	Quad USB, GP Power Distribution Switch
TPS2054	4	80	0.5 ea	0.9 ea	2.7 to 5.5	160	Each	Yes	Pos	Quad USB, GP Power Distribution Switch

† Devices released since January 1999 Designer's Guide

General Purpose Distribution Switches

General Purpose Distribution Switches

Device	Number of FETs	$r_{DS(on)}$ (m Ω) typ	Output Current (A) max	Current Limit (A) typ	V_{IN} Range (V) typ	Supply Current (μ A) typ	Over Current Reporting	Over Temp Reporting	Enable	Description
TPS2010	1	75	0.2	0.4	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2010A	1	30	0.20	0.3	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2011	1	75	0.6	1.2	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2011A	1	30	0.60	0.9	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2012	1	75	1.0	2.0	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2012A	1	30	1.00	1.5	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2013	1	75	1.5	2.6	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch
TPS2013A	1	30	1.50	2.2	2.7 to 5.5	73	No	No	Neg	GP Power Distribution Switch

High-Side PMOS Distribution Switches

Device	Number of FETs	$r_{DS(on)}$ (m Ω)* typ	V_{DS} (V) max	I_D (A) max	ESD Circuitry	Description
TPS1100	1	180	15	-1.6	Yes	Single P-channel Enhancement-Mode MOSFET
TPS1101	1	90	15	-2.3	Yes	Single P-channel Enhancement-Mode MOSFET
TPS1120	2	180	15	-1.17	Yes	Dual P-channel Enhancement-Mode MOSFET

* $V_{GS} = -10$ V

V_{AUX} Switches

Device	Number of Inputs	IN1 $r_{DS(on)}$ (m Ω)	IN2 $r_{DS(on)}$ (m Ω)	IN1 Output Current (mA)	IN2 Output Current (mA)	IN1 Supply Current (μ A)	IN2 Supply Current (μ A)	IN1, IN2 Input Voltage Range (V)	Enable Polarity	Description
TPS2100†	2	260	1.2	500	10	15.0	1.0	2.7 to 4.0	Neg	V_{AUX} Distribution Switch
TPS2101†	2	260	1.2	500	10	15.0	1.0	2.7 to 4.0	Pos	V_{AUX} Distribution Switch

† Devices released since January 1999 Designer's Guide

Power Drivers

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Power Control Products	
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Power+™ Control	5-6
Power+ Arrays™	5-8

For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

Texas Instruments offers an extensive line of the industry standard integrated circuits designed to provide highly reliable circuits for switching inductive loads such as lamps, solenoids, motors, valves, and relays.

TI power devices represent technologies from the classic bipolar process to the Texas Instruments mixed-signal process, which offer improvements in power consumption and temperature stability.

This section provides information on the following products:

- Peripheral Drivers and Actuators
- Power Control Products
 - Power+ Logic™—control logic integrated on same substrate with multiple power FETs
 - Power+™ Control—integrated power ICs and FET pre-drivers with companion power FET arrays
 - Power+ Arrays™—integrated multiple, rugged power FETs in cost-effective packaging

TI continues to enhance quality and reliability of integrated circuits by improving materials, processes, test methods, and test equipment. Quality and performance are monitored throughout all phases of manufacturing; quality specifications and programs are continuously enhanced.

Web Location

Power Control Products www.ti.com/sc/docs/msp/powr_con/default.htm

Power Drivers Overview

Power Drivers
OverviewPeripheral Drivers
and Actuators

DS3680
L293
L293D
SN75372
SN75374
SN75437A
SN754410
SN75451B
SN75452B
SN75453B
SN75454B
SN75462
SN75463
SN75468
SN75469
SN75471
SN75472
SN75477
SN75478
ULN2002A
ULN2003A
ULN2004A

Power Control Products

Power+ Logic

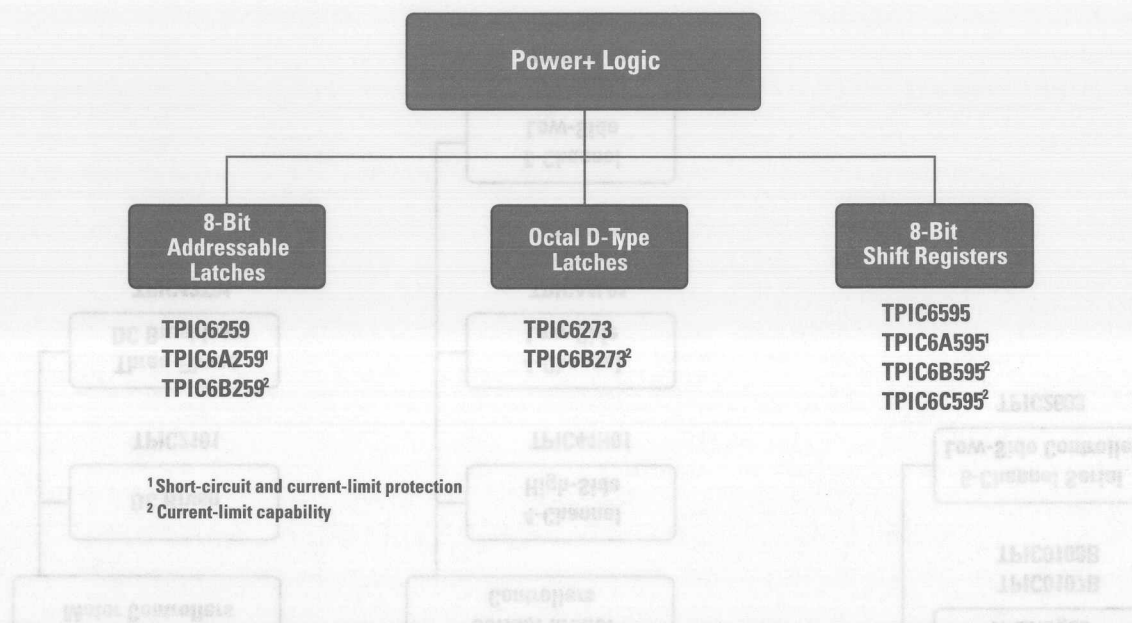
Power+ Control

Power+ Arrays

Peripheral Drivers and Actuators

Device	V _O (V) max	Switching Voltage (V) max	Peak Output Current (mA) max	Drivers Per Package	Output Clamp Diodes	Logic	Input Compatibility	Delay Time (ns) typ	Description
SN75372	24	24	500	2	Yes	NAND	TTL	20	MOSFET Driver
SN75374	24	24	500	4	Yes	NAND	TTL	20	MOSFET Driver
SN75451B	30	20	500	2	No	AND	TTL	18	Peripheral Driver
SN75452B	30	20	500	2	No	NAND	TTL	26	Peripheral Driver
SN75453B	30	20	500	2	No	OR	TTL	18	Peripheral Driver
SN75454B	30	20	500	2	No	NOR	TTL	27	Peripheral Driver
SN75462	35	30	500	2	No	NAND	TTL	45	Peripheral Driver
SN75463	35	30	500	2	No	OR	TTL	30	Peripheral Driver
L293D	36	36	1200	4	Yes	Quad Half-H	TTL	800	Half-H Driver
L293	36	36	2000	4	No	Quad Half-H	TTL	800	Half-H Driver
SN754410	36	36	2000	4	Yes	Quad Half-H	CMOS,TTL	800	Half-H Driver
ULN2002A	50	50	500	7	Yes	Invert	CMOS	250	Darlington Transistor Array
ULN2003A	50	50	500	7	Yes	Invert	CMOS,TTL	250	Darlington Transistor Array
ULN2004A	50	50	500	7	Yes	Invert	CMOS	250	Darlington Transistor Array
DS3680	60	60	100	4	Yes	Telecom Relay Driver	CMOS,TTL	1000	Telephone Relay Driver
SN75471	70	55	500	2	No	AND	TTL	30	Peripheral Driver
SN75472	70	55	500	2	No	NAND	TTL	45	Peripheral Driver
SN75437A	70	35	750	4	Yes	Invert	CMOS,TTL	1950	Peripheral Driver
SN75477	100	55	500	2	Yes	NAND	CMOS,TTL	200	Peripheral Driver
SN75478	100	55	500	2	Yes	OR	CMOS,TTL	200	Peripheral Driver
SN75468	100	50	500	7	Yes	Invert	CMOS,TTL	250	Darlington Transistor Array
SN75469	100	50	500	7	Yes	Invert	CMOS	250	Darlington Transistor Array

Power+ Logic

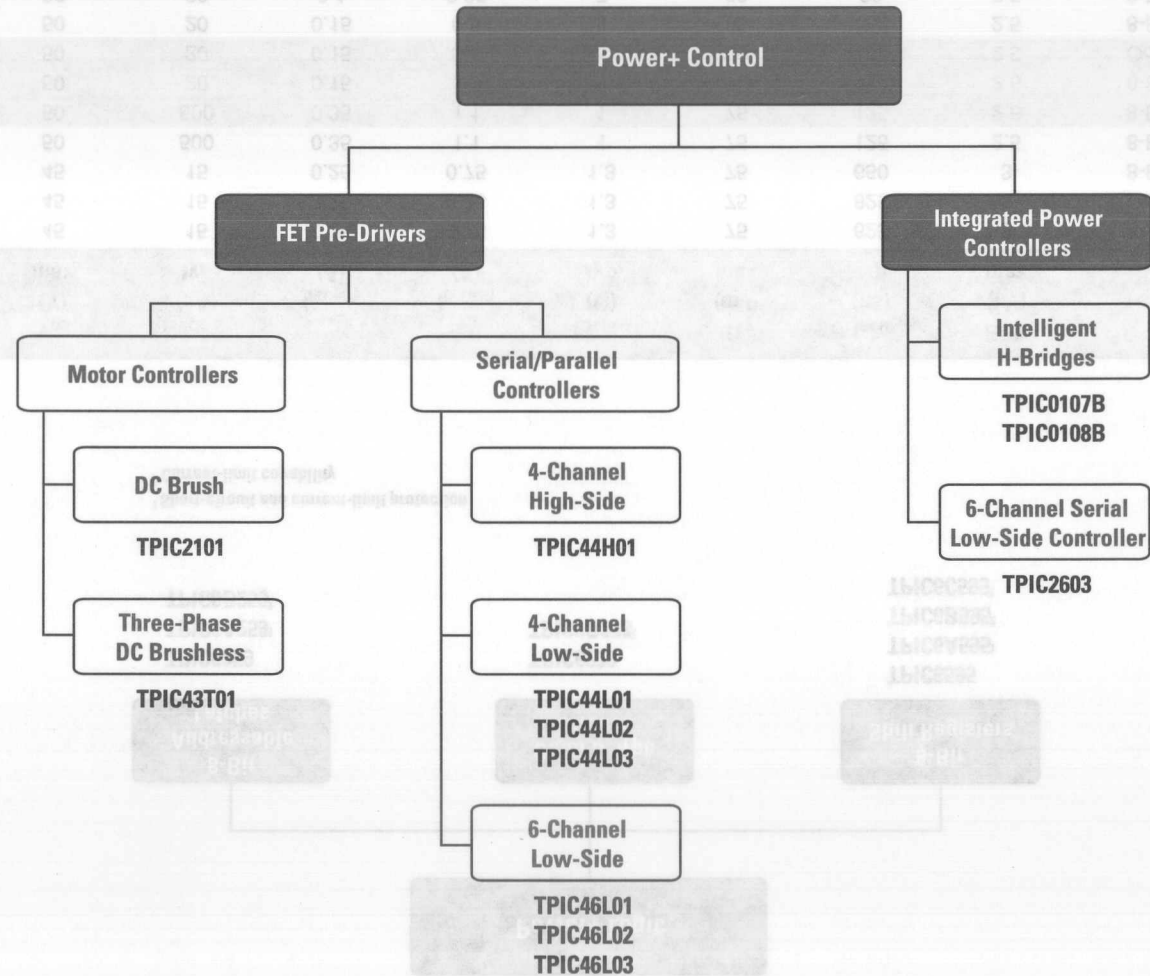


Device	V _{DS} (V) max	I _{CC} (μ A) typ	I _(CONT) (A)	I _(PEAK) (A)	r _{DS(on)} (Ω) typ	E _{AS} (mJ) max	t _{PLH} (ns) typ	ESD (kV) max	Description
TPIC6259	45	15	0.25	0.75	1.3	75	625	3	8-Bit Addressable Latch
TPIC6273	45	15	0.25	0.75	1.3	75	625	3	Octal D-Type Latch
TPIC6595	45	15	0.25	0.75	1.3	75	650	3	8-Bit Shift Register
TPIC6A259 ¹	50	500	0.35	1.1	1	75	125	2.5	8-Bit Addressable Latch
TPIC6A595 ¹	50	500	0.35	1.1	1	75	125	2.5	8-Bit Shift Register
TPIC6B259 ²	50	20	0.15	0.5	5	30	150	2.5	8-Bit Addressable Latch
TPIC6B273 ²	50	20	0.15	0.5	5	30	150	2.5	Octal D-Type Latch
TPIC6B595 ²	50	20	0.15	0.5	5	30	150	2.5	8-Bit Shift Register
TPIC6C595 ²	33	20	0.1	0.25	7	30	80	2.5	8-Bit Shift Register

¹ Short-circuit and current-limit protection

² Current-limit capability

Power+ Control



Power+ Control—DC Brush Motor Controller

Device	$V_{(bat)}$ (V) range	$I_{(bat)}$ (mA) typ	$f_{(osc)}$ (kHz) typ	I_{GD} (mA) max	t_r/t_f (μ s) max	Fault Protection	Description
TPIC2101	8 to 16	4	20	50	1/0.8	Yes	DC Brush Motor Controller

Power+ Control—Three-Phase DC Brushless Motor Controller

Device	V_{CC} (V) range	f_{PWM} (kHz) max	$f_{(OSC)}/f_{(OSC1)}$ (MHz) max	$V_{IT\pm(HL)}$ (mV) range	$I_{(LGX)}/(UGX)$ (mA) typ	Fault Protection	Description
TPIC43T01	18 to 28	27	10/10	± 4 to ± 12	± 10	Yes	Three-Phase Brushless Motor RPM Controller

Power+ Control—Serial/Parallel Controllers

Device	$V_{(bat)}$ (V) range	$I_{(bat)}$ (mA) typ	$V_{(GATE)}$ (V) range	f_{SCLK} (MHz) max	Diagnostics	Fault Protection	Description
TPIC44H01	8 to 24	4	$V_{(bat)} + 4$ to $V_{(bat)} + 18$	5	Yes	Yes	4-Channel Serial/Parallel High-Side FET Pre-Driver
TPIC44L01	8 to 24	0.5	7 to 13.5	10	Yes	Yes	4-Channel Serial/Parallel Low-Side FET Pre-Driver
TPIC44L02	8 to 24	0.5	7 to 13.5	10	Yes	Yes	4-Channel Serial/Parallel Low-Side FET Pre-Driver
TPIC44L03	8 to 24	0.5	7 to 13.5	10	Yes	Yes	4-Channel Serial/Parallel Low-Side FET Pre-Driver
TPIC46L01	8 to 24	0.5	7 to 13.5	10	Yes	Yes	6-Channel Serial/Parallel Low-Side FET Pre-Driver
TPIC46L02	8 to 24	0.5	7 to 13.5	10	Yes	Yes	6-Channel Serial/Parallel Low-Side FET Pre-Driver
TPIC46L03	8 to 24	0.5	7 to 13.5	10	Yes	Yes	6-Channel Serial/Parallel Low-Side FET Pre-Driver

Power+ Control—Integrated Power Controllers

Device	$V_{(bat)}$ (V) range	V_{DS} (V) max	I_D/I_{PEAK} (A) typ/max	$r_{DS(on)}$ (Ω) typ	Frequency (kHz) typ	Diagnostics	Fault Protection	Description
TPIC0107B	6 to 18	40	3/5	0.28	2	Yes	Yes	PWM Control Intelligent H-Bridge
TPIC0108B	6 to 18	40	3/5	0.28	2	Yes	Yes	PWM Control Intelligent H-Bridge
TPIC2603	5.5 to 25	68	0.35/2.25	0.7	4000	Yes	Yes	6-Channel Serial Interface Low-Side Controller

Power+ Arrays

Power+ Arrays

H-Bridge
Driver

3-Half

TPIC1310

Low-Side
Common-Source
Drivers

4-Channel

TPIC2401

6-Channel

TPIC2601

7-Channel

TPIC2701

Device	V _{DS} (V) max	V _{GS} (V) typ	I _(CONT) (A)	I _(PEAK) (A)	r _{DS(on)} (Ω) typ	E _{AS} (mJ) max	t _{rr} (ns) typ	Q _g (nC) typ	ESD (kV) max	Description
TPIC1310	30	1.2	3	12	0.25		30 ¹ /70 ²	1.6	2	3-Half H-Bridge Driver
TPIC2401	60	10	1.5	6	0.3	36	80	4	2	4-Channel Common-Source Driver
TPIC2601	60	10	2	10	0.25	105	72	5.1	2	6-Channel Common-Source Driver
TPIC2701	60	15	0.5	3	0.5	22	165	2.8		7-Channel Common-Source Driver

¹ High-side² Low-side

Clock Drivers & Timers

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For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

Clock Distribution Circuits

TI's clock distribution circuits provide accurate clock-generation circuitry fundamental to every digital system, producing timing signals that are used to synchronize system activity. To meet the stringent clock-signal timing requirements of today's systems, TI offers a series of low propagation delay and skew, high-fan-out clock drivers designed to effectively drive high-performance clocking systems.

Overview

- Series of low propagation delay and skew, high-fan-out clock drivers designed to effectively drive high-performance clocking systems.
- Provide accurate clock-generation circuitry fundamentals to every digital system.
- Special clock-driver functions available in the ACL, ABT, and AS technologies, as well as 3 V and 5 V.
- Come in buffered, flip-flop, and phase-locked loop-based elements.
- Available in a variety of packages, including standard and advanced surface-mount packaging.

Clock Drivers & Timers New Product Previews

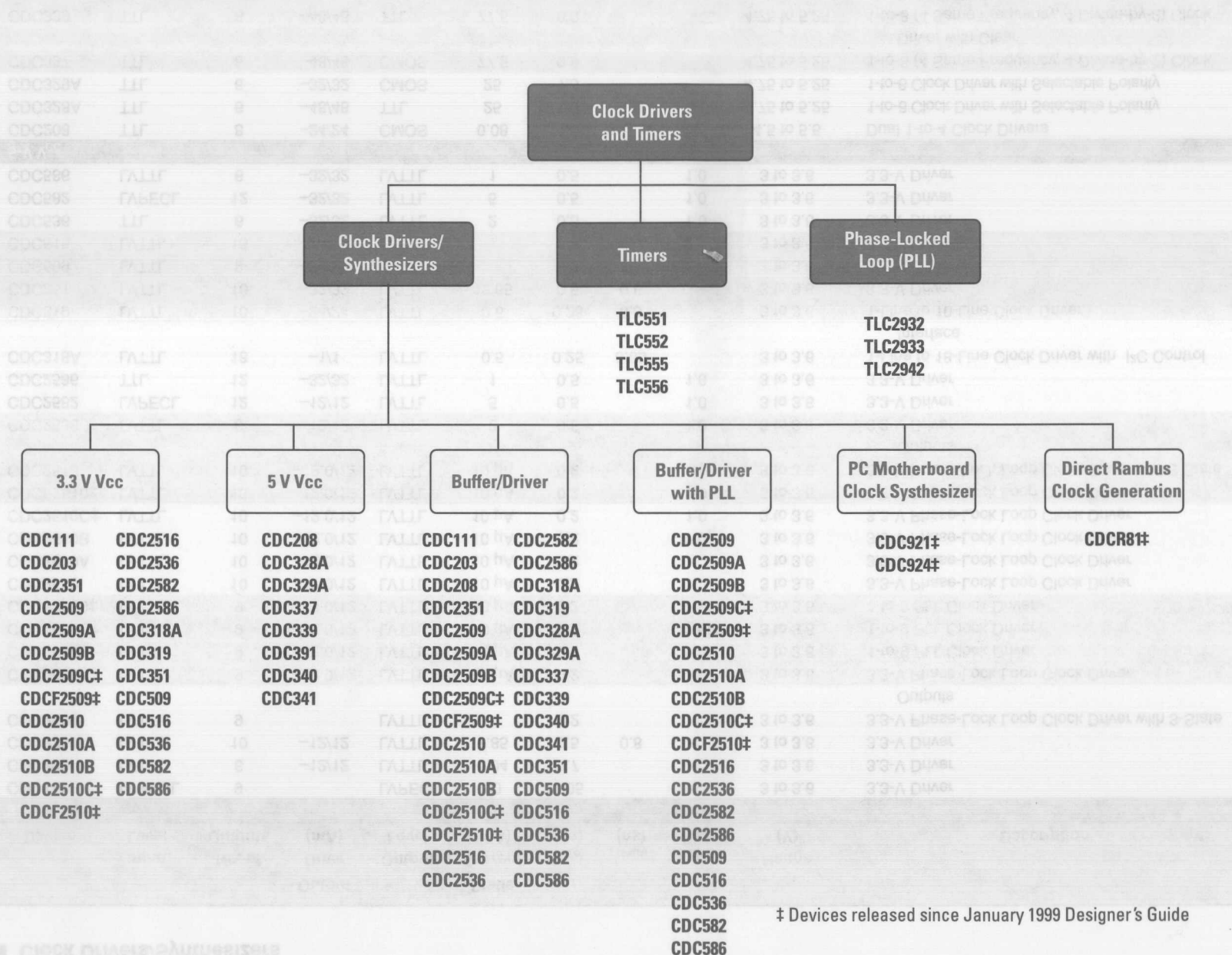
The following new devices are expected to be released in the near future. For more information, please refer to the InfoNavigator CD-ROM, literature number SLYC005C.

Device	Description
Clock Drivers	
CDCR82	400-MHz Direct Rambus™ Clock Generator
CDCR83	400-MHz Direct Rambus Clock Generator
CDCVF2509	1:9 PLL Clock Driver, 400 MHz
CDCVF2510	1:10 PLL Clock Driver, 400 MHz
CDC857	1:10 SSTL-II Differential Clock Driver Featuring a PLL Disable Mode

Web Locations for Specific Product Groups

Clock Drivers & Timers	www.ti.com/sc/docs/products/msp/clock/index.htm
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Clock Drivers and Timers



Clock Drivers/Synthesizers

Device	Input Level	No. of Outputs	Output Drive (mA)	Output Level	Static Current (mA)	$t_{sk(o)}$ (ns)	$t_{sk(p)}$ (ns)	$t_{sk(pr)}$ (ns)	V_{CC} Range (V)	Description
3.3-V V_{CC}										
CDC111	LVPECL	9		LVPECL	80	0.05			3 to 3.6	3.3-V Driver
CDC203	LVTTL	6	-12/12	LVTTL	0.04	0.7			3 to 3.6	3.3-V Driver
CDC2351	LVTTL	10	-12/12	LVTTL	7.85	0.5	0.8		3 to 3.6	3.3-V Driver
CDC2509	LVTTL	9		LVTTL	0.2				3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2509A	LVTTL	9	-12.0/12	LVTTL	10 μ A	0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2509B	LVTTL	9	-12.0/12	LVTTL	10 μ A	0.2		1.0	3 to 3.6	1-to-9 PLL Clock Driver
CDC2509C \ddagger	LVTTL	9	-12.0/12	LVTTL	10 μ A	0.2		1.0	3 to 3.6	1-to-9 PLL Clock Driver
CDCF2509 \ddagger	LVTTL	9	-12.0/12	LVTTL	10 μ A	0.2		1.0	3 to 3.6	1-to-9 PLL Clock Driver
CDC2510	LVTTL	10	-12.0/12	LVTTL	10 μ A	0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510A	LVTTL	10	-12.0/12	LVTTL	10 μ A	0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510B	LVTTL	10	-12.0/12	LVTTL	10 μ A	0.2		1.0	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510C \ddagger	LVTTL	10	-12.0/12	LVTTL	10 μ A	0.2		1.0	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDCF2510 \ddagger	LVTTL	10	-12.0/12	LVTTL	10 μ A	0.2		1.0	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2516	LVTTL	16	-12.0/12	LVTTL	10 μ A	0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2536	LVTTL	6	-12/12	LVTTL	2	0.5		1.0	3 to 3.6	3.3-V Driver
CDC2582	LVPECL	12	-12/12	LVTTL	5	0.5		1.0	3 to 3.6	3.3-V Driver
CDC2586	TTL	12	-32/32	LVTTL	1	0.5		1.0	3 to 3.6	3.3-V Driver
CDC318A	LVTTL	18	-1/1	LVTTL	0.5	0.25	0.65		3 to 3.6	1-Line to 18-Line Clock Driver with I ² C Control Interface
CDC319	LVTTL	10	-24/24	LVTTL	0.5	0.25	0.5		3 to 3.6	1-Line to 10-Line Clock Driver
CDC351	LVTTL	10	-32/32	LVTTL	12.65	0.5	0.8		3 to 3.6	3.3-V Driver
CDC509	LVTTL	9	-24/24	LVTTL		0.2			3 to 3.6	3.3-V Driver
CDC516	LVTTL	16	-24/24	LVTTL		0.2			3 to 3.6	3.3-V Driver
CDC536	TTL	6	-32/32	LVTTL	2	0.5		1.0	3 to 3.6	3.3-V Driver
CDC582	LVPECL	12	-32/32	LVTTL	5	0.5		1.0	3 to 3.6	3.3-V Driver
CDC586	LVTTL	6	-32/32	LVTTL	1	0.5		1.0	3 to 3.6	3.3-V Driver
5-V V_{CC}										
CDC208	TTL	8	-24/24	CMOS	0.08	1.0			4.5 to 5.5	Dual 1-to-4 Clock Drivers
CDC328A	TTL	6	-48/48	TTL	25	1.0	1.0		4.75 to 5.25	1-to-6 Clock Driver with Selectable Polarity
CDC329A	TTL	6	-32/32	CMOS	25	1.5			4.75 to 5.25	1-to-6 Clock Driver with Selectable Polarity
CDC337	TTL	8	-48/48	CMOS	77.5	0.9			4.75 to 5.25	1-to-8 (4 Same Frequency, 4 Divide-by-2) Clock Driver with Clear
CDC339	TTL	8	-48/48	TTL	77.5	0.9			4.75 to 5.25	1-to-8 (4 Same Frequency, 4 Divide-by-2) Clock Driver with Clear

 \ddagger Devices released since January 1999 Designer's Guide

Clock Drivers/Synthesizers (Continued)

Device	Input Level	No. of Outputs	Output Drive (mA)	Output Level	Static Current (mA)	$t_{sk(o)}$ (ns)	$t_{sk(p)}$ (ns)	$t_{sk(pr)}$ (ns)	V_{CC} Range (V)	Description
5-V V_{CC} (Continued)										
CDC391	TTL	6	-48/48	TTL	25	1.0	1.0		4.75 to 5.25	1-to-6 Clock Driver with Selectable Polarity & 3-State Output
CDC340	TTL	8	-48/48	TTL	18.25	0.6	0.9		4.75 to 5.25	1-to-8 Clock Driver with Tight AC Specification
CDC341	TTL	8	-48/48	TTL	18.25	0.6	0.9		4.75 to 5.25	1-to-8 Clock Driver with Tight AC Specification
Buffer/Driver										
CDC111	LVPECL	9		LVPECL	80	0.05			3 to 3.6	3.3-V Driver
CDC203	LVTTTL	6	-12/12	LVTTTL	0.04	0.7			3 to 3.6	3.3-V Driver
CDC208	TTL	8	-24/24	CMOS	0.08	1.0			4.5 to 5.5	Dual 1-to-4 Clock Drivers
CDC2351	LVTTTL	10	-12/12	LVTTTL	7.85	0.5	0.8		3 to 3.6	3.3-V Driver
CDC2509	LVTTTL	9		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2509A	LVTTTL	9		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2509B	TTL	9	-12.0	TTL	10 μ A	0.2		1	3 to 3.6	1-to-9 PLL Clock Driver
CDC2509C†	TTL	9	-12.0	TTL	10 μ A	0.2		1	3 to 3.6	1-to-9 PLL Clock Driver
CDCF2509†	TTL	9	-12.0	TTL	10 μ A	0.2		1	3 to 3.6	1-to-9 PLL Clock Driver
CDC2510	LVTTTL	10		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510A	LVTTTL	10		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510B	TTL	10	-12.0	TTL	10 μ A	0.2		1	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510C†	TTL	10	-12.0	TTL	10 μ A	0.2		1	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDCF2510†	TTL	10	-12.0	TTL	10 μ A	0.2		1	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2516	LVTTTL	16		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2536	LVTTTL	6	-12/12	LVTTTL	2	0.5		1.0	3 to 3.6	3.3-V Driver
CDC2582	LVPECL	12	-12/12	LVTTTL	5	0.5		1.0	3 to 3.6	3.3-V Driver
CDC2586	TTL	12	-32/32	LVTTTL	1	0.5		1.0	3 to 3.6	3.3-V Driver
CDC318A	LVTTTL	18	-1/1	LVTTTL	0.5	0.25	0.65		3 to 3.6	1-Line to 18-Line Clock Driver with I ² C Control Interface
CDC319	LVTTTL	10	-24/24	LVTTTL	0.5	0.25	0.5		3 to 3.6	1-Line to 10-Line Clock Driver
CDC328A	TTL	6	-48/48	TTL	25	1.0	1.0		4.75 to 5.25	1-to-6 Clock Driver with Selectable Polarity
CDC329A	TTL	6	-32/32	CMOS	25	1.5			4.75 to 5.25	1-to-6 Clock Driver with Selectable Polarity
CDC337	TTL	8	-48/48	CMOS	77.5	0.9			4.75 to 5.25	1-to-8 (4 Same Frequency, 4 Divide-by-2) Clock Driver with Clear

† Devices released since January 1999 Designer's Guide

Clock Drivers/Synthesizers (Continued)

Device	Input Level	No. of Outputs	Output Drive (mA)	Output Level	Static Current (mA)	$t_{sk(o)}$ (ns)	$t_{sk(p)}$ (ns)	$t_{sk(pr)}$ (ns)	V_{CC} Range (V)	Description
Buffer/Driver (Continued)										
CDC339	TTL	8	-48/48	TTL	77.5	0.9			4.75 to 5.25	1-to-8 (4 Same Frequency, 4 Divide-by-2) Clock Driver with Clear
CDC340	TTL	8	-48/48	TTL	18.25	0.6	0.9		4.75 to 5.25	1-to-8 Clock Driver with Tight AC Specification
CDC341	TTL	8	-48/48	TTL	18.25	0.6	0.9		4.75 to 5.25	1-to-8 Clock Driver with Tight AC Specification
CDC351	LVTTTL	10	-32/32	LVTTTL	12.65	0.5	0.8		3 to 3.6	3.3-V Driver
CDC509	LVTTTL	9	-24/24	LVTTTL		0.2			3 to 3.6	3.3-V Driver
CDC516	LVTTTL	16	-24/24	LVTTTL		0.2			3 to 3.6	3.3-V Driver
CDC536	TTL	6	-32/32	LVTTTL	2	0.5		1.0	3 to 3.6	3.3-V Driver
CDC582	LVPECL	12	-32/32	LVTTTL	5	0.5		1.0	3 to 3.6	3.3-V Driver
CDC586	LVTTTL	6	-32/32	LVTTTL	1	0.5		1.0	3 to 3.6	3.3-V Driver
Buffer/Driver with PLL										
CDC2509	LVTTTL	9		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2509A	LVTTTL	9		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2509B	TTL	9	-12.0	TTL	10	0.2		1	3 to 3.6	1-to-9 PLL Clock Driver
CDC2509C†	TTL	9	-12.0	TTL	10	0.2		1	3 to 3.6	1-to-9 PLL Clock Driver
CDC2509†	TTL	9	-12.0	TTL	10	0.2		1	3 to 3.6	1-to-9 PLL Clock Driver
CDC2510	LVTTTL	10		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510A	LVTTTL	10		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510B	TTL	10	-12.0	TTL	10	0.2		1	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510C†	TTL	10	-12.0	TTL	10	0.2		1	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2510†	TTL	10	-12.0	TTL	10	0.2		1	3 to 3.6	3.3-V Phase-Lock Loop Clock Driver
CDC2516	LVTTTL	16		LVTTTL		0.2			3 to 3.6	3.3-V Phase-Lock Loop Clock Driver with 3-State Outputs
CDC2536	LVTTTL	6	-12/12	LVTTTL	2	0.5		1.0	3 to 3.6	3.3-V Driver
CDC2582	LVPECL	12	-12/12	LVTTTL	5	0.5		1.0	3 to 3.6	3.3-V Driver
CDC2586	TTL	12	-32/32	LVTTTL	1	0.5		1.0	3 to 3.6	3.3-V Driver
CDC509	LVTTTL	9	-24/24	LVTTTL		0.2			3 to 3.6	3.3-V Driver
CDC516	LVTTTL	16	-24/24	LVTTTL		0.2			3 to 3.6	3.3-V Driver
CDC536	TTL	6	-32/32	LVTTTL	2	0.5		1.0	3 to 3.6	3.3-V Driver
CDC582	LVPECL	12	-32/32	LVTTTL	5	0.5		1.0	3 to 3.6	3.3-V Driver
CDC586	LVTTTL	6	-32/32	LVTTTL	1	0.5		1.0	3 to 3.6	3.3-V Driver

† Devices released since January 1999 Designer's Guide

PC Motherboard Clock Synthesizer

Device	I/O Levels	CPU Frequency (MHz) max	V _{CC} (V)	Description
CDC924†	LVTTL/LVTTL, TTL	133, 100	3.3/2.5	PC Motherboard Clock Synthesizer/Driver, 133-MHz Max Frequency with Spread Spectrum
CDC921†	LVTTL/LVTTL, TTL	133, 100	3.3/2.5	PC Motherboard Clock Synthesizer/Driver, 133-MHz Max Frequency with Spread Spectrum

† Devices released since January 1999 Designer's Guide

Direct Rambus™ Clock Generation

Device	I/O Levels	Frequency (MHz)	V _{CC} Range (V)	Description
CDCR81†	CMOS/RSL	267 to 400	3.5	400-MHz Direct Rambus Clock Generator ("the Classic")

† Devices released since January 1999 Designer's Guide

JFC7323	100	100	5	3.0/2.0
JFC5805	100	80	5	3.0/2.0
JFC7324	100	100	5	3.0/2.0
JFC7325	100	100	5	3.0/2.0
JFC7326	100	100	5	3.0/2.0
JFC7327	100	100	5	3.0/2.0
JFC7328	100	100	5	3.0/2.0
JFC7329	100	100	5	3.0/2.0
JFC7330	100	100	5	3.0/2.0
JFC7331	100	100	5	3.0/2.0
JFC7332	100	100	5	3.0/2.0
JFC7333	100	100	5	3.0/2.0
JFC7334	100	100	5	3.0/2.0
JFC7335	100	100	5	3.0/2.0
JFC7336	100	100	5	3.0/2.0
JFC7337	100	100	5	3.0/2.0
JFC7338	100	100	5	3.0/2.0
JFC7339	100	100	5	3.0/2.0
JFC7340	100	100	5	3.0/2.0
JFC7341	100	100	5	3.0/2.0
JFC7342	100	100	5	3.0/2.0
JFC7343	100	100	5	3.0/2.0
JFC7344	100	100	5	3.0/2.0
JFC7345	100	100	5	3.0/2.0
JFC7346	100	100	5	3.0/2.0
JFC7347	100	100	5	3.0/2.0
JFC7348	100	100	5	3.0/2.0
JFC7349	100	100	5	3.0/2.0
JFC7350	100	100	5	3.0/2.0
JFC7351	100	100	5	3.0/2.0
JFC7352	100	100	5	3.0/2.0
JFC7353	100	100	5	3.0/2.0
JFC7354	100	100	5	3.0/2.0
JFC7355	100	100	5	3.0/2.0
JFC7356	100	100	5	3.0/2.0
JFC7357	100	100	5	3.0/2.0
JFC7358	100	100	5	3.0/2.0
JFC7359	100	100	5	3.0/2.0
JFC7360	100	100	5	3.0/2.0
JFC7361	100	100	5	3.0/2.0
JFC7362	100	100	5	3.0/2.0
JFC7363	100	100	5	3.0/2.0
JFC7364	100	100	5	3.0/2.0
JFC7365	100	100	5	3.0/2.0
JFC7366	100	100	5	3.0/2.0
JFC7367	100	100	5	3.0/2.0
JFC7368	100	100	5	3.0/2.0
JFC7369	100	100	5	3.0/2.0
JFC7370	100	100	5	3.0/2.0
JFC7371	100	100	5	3.0/2.0
JFC7372	100	100	5	3.0/2.0
JFC7373	100	100	5	3.0/2.0
JFC7374	100	100	5	3.0/2.0
JFC7375	100	100	5	3.0/2.0
JFC7376	100	100	5	3.0/2.0
JFC7377	100	100	5	3.0/2.0
JFC7378	100	100	5	3.0/2.0
JFC7379	100	100	5	3.0/2.0
JFC7380	100	100	5	3.0/2.0
JFC7381	100	100	5	3.0/2.0
JFC7382	100	100	5	3.0/2.0
JFC7383	100	100	5	3.0/2.0
JFC7384	100	100	5	3.0/2.0
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JFC7387	100	100	5	3.0/2.0
JFC7388	100	100	5	3.0/2.0
JFC7389	100	100	5	3.0/2.0
JFC7390	100	100	5	3.0/2.0
JFC7391	100	100	5	3.0/2.0
JFC7392	100	100	5	3.0/2.0
JFC7393	100	100	5	3.0/2.0
JFC7394	100	100	5	3.0/2.0
JFC7395	100	100	5	3.0/2.0
JFC7396	100	100	5	3.0/2.0
JFC7397	100	100	5	3.0/2.0
JFC7398	100	100	5	3.0/2.0
JFC7399	100	100	5	3.0/2.0

Phase-Locked Loop

JFC928	100	100	5	3.0/2.0
JFC929	100	100	5	3.0/2.0
JFC930	100	100	5	3.0/2.0
JFC931	100	100	5	3.0/2.0
JFC932	100	100	5	3.0/2.0
JFC933	100	100	5	3.0/2.0
JFC934	100	100	5	3.0/2.0
JFC935	100	100	5	3.0/2.0
JFC936	100	100	5	3.0/2.0
JFC937	100	100	5	3.0/2.0
JFC938	100	100	5	3.0/2.0
JFC939	100	100	5	3.0/2.0
JFC940	100	100	5	3.0/2.0
JFC941	100	100	5	3.0/2.0
JFC942	100	100	5	3.0/2.0
JFC943	100	100	5	3.0/2.0
JFC944	100	100	5	3.0/2.0
JFC945	100	100	5	3.0/2.0
JFC946	100	100	5	3.0/2.0
JFC947	100	100	5	3.0/2.0
JFC948	100	100	5	3.0/2.0
JFC949	100	100	5	3.0/2.0
JFC950	100	100	5	3.0/2.0
JFC951	100	100	5	3.0/2.0
JFC952	100	100	5	3.0/2.0
JFC953	100	100	5	3.0/2.0
JFC954	100	100	5	3.0/2.0
JFC955	100	100	5	3.0/2.0
JFC956	100	100	5	3.0/2.0
JFC957	100	100	5	3.0/2.0
JFC958	100	100	5	3.0/2.0
JFC959	100	100	5	3.0/2.0
JFC960	100	100	5	3.0/2.0
JFC961	100	100	5	3.0/2.0
JFC962	100	100	5	3.0/2.0
JFC963	100	100	5	3.0/2.0
JFC964	100	100	5	3.0/2.0
JFC965	100	100	5	3.0/2.0
JFC966	100	100	5	3.0/2.0
JFC967	100	100	5	3.0/2.0
JFC968	100	100	5	3.0/2.0
JFC969	100	100	5	3.0/2.0
JFC970	100	100	5	3.0/2.0
JFC971	100	100	5	3.0/2.0
JFC972	100	100	5	3.0/2.0
JFC973	100	100	5	3.0/2.0
JFC974	100	100	5	3.0/2.0
JFC975	100	100	5	3.0/2.0
JFC976	100	100	5	3.0/2.0
JFC977	100	100	5	3.0/2.0
JFC978	100	100	5	3.0/2.0
JFC979	100	100	5	3.0/2.0
JFC980	100	100	5	3.0/2.0
JFC981	100	100	5	3.0/2.0
JFC982	100	100	5	3.0/2.0
JFC983	100	100	5	3.0/2.0
JFC984	100	100	5	3.0/2.0
JFC985	100	100	5	3.0/2.0
JFC986	100	100	5	3.0/2.0
JFC987	100	100	5	3.0/2.0
JFC988	100	100	5	3.0/2.0
JFC989	100	100	5	3.0/2.0
JFC990	100	100	5	3.0/2.0
JFC991	100	100	5	3.0/2.0
JFC992	100	100	5	3.0/2.0
JFC993	100	100	5	3.0/2.0
JFC994	100	100	5	3.0/2.0
JFC995	100	100	5	3.0/2.0
JFC996	100	100	5	3.0/2.0
JFC997	100	100	5	3.0/2.0
JFC998	100	100	5	3.0/2.0
JFC999	100	100	5	3.0/2.0

Timers

Timers

Device	Description
TLC551	LinCMOSTM Timer
TLC552	Dual LinCMOS Timer
TLC555	Low Power Timer
TLC556	Dual LinCMOS Timer

Phase-Locked Loop

Device	Clock Jitter (ps) typ	Lock Frequency (MHz) max	Output Current (mA) max	Supply Voltage (V)
TLC2932	100	50	2	3.0/5.0
TLC2933	100	100	2	3.0/5.0
TLC2942	100	50	2	3.0/5.0

Microcontrollers

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Product Decision Tree and Selection Guide

MSP430 Ultra-Low-Power Microcontrollers 7-3

For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

The MSP430 family of microcontrollers is optimized for battery-operated applications such as consumer electronic devices or industrial applications like remote utility metering. The MSP430 devices offer:

- Ultra-low power consumption (400 μ A active mode, 1.3 μ A standby mode, 0.1 μ A off mode)
- High throughput, 16-bit RISC architecture
- Integrated A/D converter
- Integral LCD driver

Microcontrollers New Product Previews

The following new devices are expected to be released in the near future. For more information, please refer to the InfoNavigator CD-ROM, literature number SLYC005C.

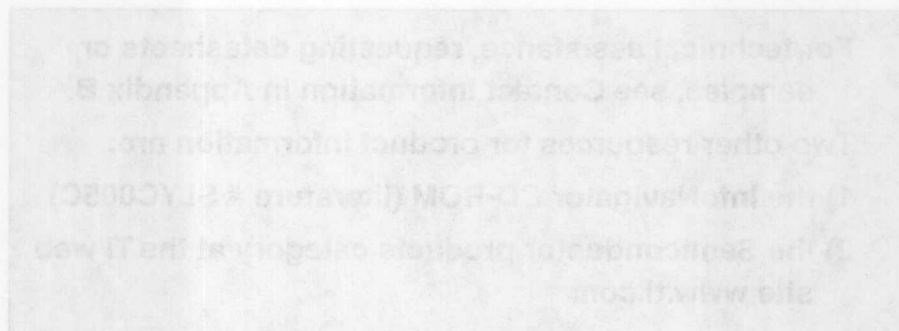
Device	Description
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MSP430 Ultra-Low-Power Microcontrollers

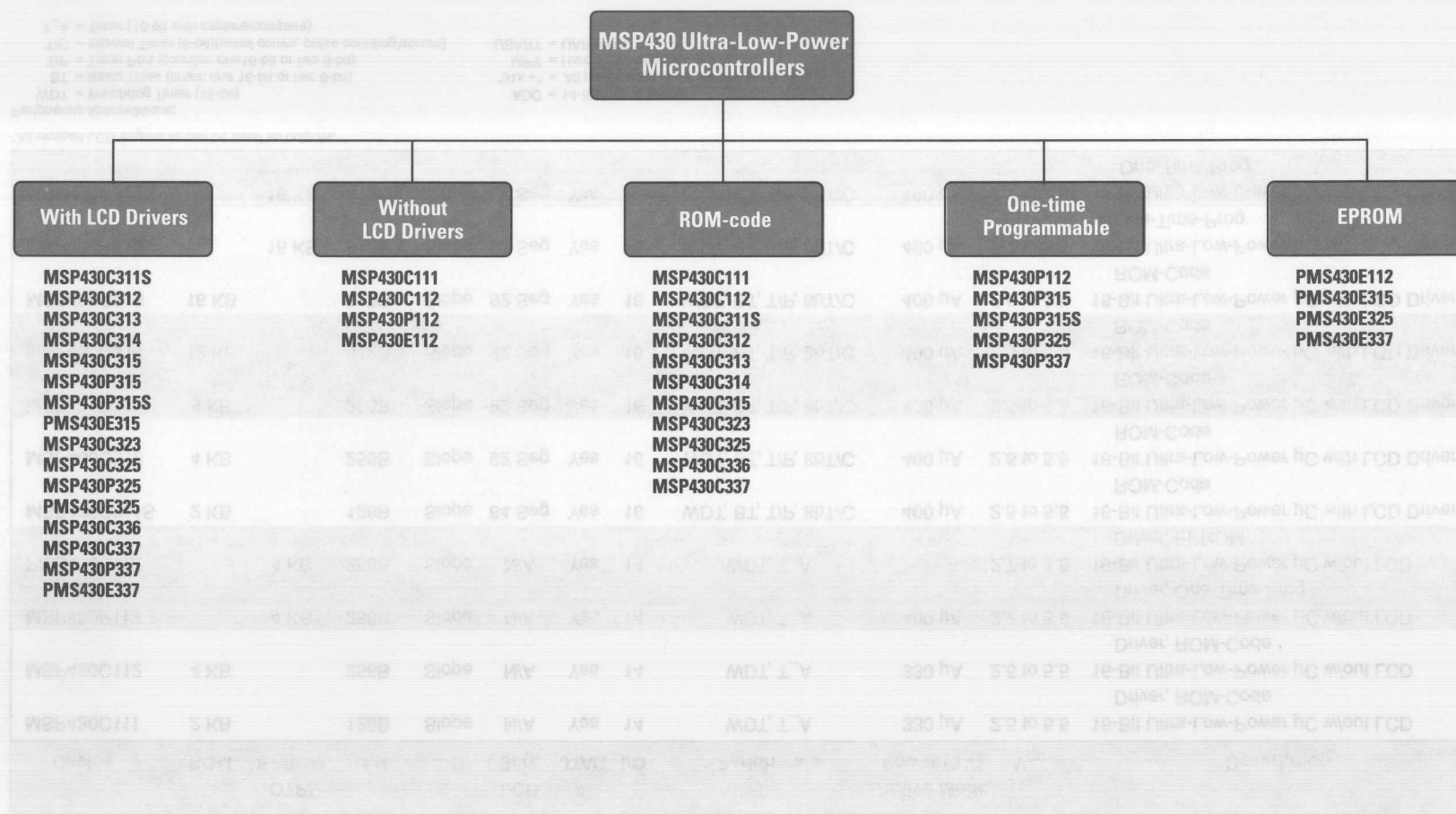
MSP430P325A Ultra-Low-Power, 16-Bit RISC Microcontroller w/LCD Driver, Multiple Timers, and 14-Bit A/D, V_{CC} 2.5 to 5.5 V

Web Locations for Specific Product Groups

MSP430 Microcontrollers www.ti.com/sc/docs/products/micro/index.htm



MSP430 Ultra-Low-Power Microcontrollers



MSP430 Ultra-Low-Power Microcontrollers

Device	ROM	OTP/ EPROM	RAM	A/D	LCD Seg.	JTAG	I/O	Peripherals	Active Mode Power (3 V)	V _{CC}	Description
MSP430C111	2 KB		128B	Slope	N/A	Yes	14	WDT, T_A	330 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC w/out LCD Driver, ROM-Code
MSP430C112	4 KB		256B	Slope	N/A	Yes	14	WDT, T_A	330 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC w/out LCD Driver, ROM-Code
MSP430P112		4 KB	256B	Slope	N/A	Yes	14	WDT, T_A	400 µA	2.7 to 5.5	16-Bit Ultra-Low-Power µC w/out LCD Driver, One-Time-Prog
PMS430E112		4 KB	256B	Slope	N/A	Yes	14	WDT, T_A		2.7 to 5.5	16-Bit Ultra-Low-Power µC w/out LCD Driver, EPROM
MSP430C311S	2 KB		128B	Slope	64 Seg	Yes	16	WDT, BT, T/P, 8bT/C	400 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, ROM-Code
MSP430C312	4 KB		256B	Slope	92 Seg	Yes	16	WDT, BT, T/P, 8bT/C	400 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, ROM-Code
MSP430C313	8 KB		256B	Slope	92 Seg	Yes	16	WDT, BT, T/P, 8bT/C	400 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, ROM-Code
MSP430C314	12 KB		512B	Slope	92 Seg	Yes	16	WDT, BT, T/P, 8bT/C	400 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, ROM-Code
MSP430C315	16 KB		512B	Slope	92 Seg	Yes	16	WDT, BT, T/P, 8bT/C	400 µA	2.5 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, ROM-Code
MSP430P315		16 KB	512B	Slope	92 Seg	Yes	16	WDT, BT, T/P, 8bT/C	490 µA	2.7 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, One-Time-Prog
MSP430P315S		16 KB	512B	Slope	64 Seg	Yes	16	WDT, BT, T/P, 8bT/C	490 µA	2.7 to 5.5	16-Bit Ultra-Low-Power µC with LCD Driver, One-Time-Prog

*All unused LCD segments can be used as outputs.

Peripherals Abbreviations:

WDT = Watchdog Timer (16-bit)

BT = Basic Timer (timer: one 16-bit or two 8-bit)

T/P = Timer Port (counter: one 16-bit or two 8-bit)

T/C = Interval Timer (8-bit)(serial comm, pulse counting/accum)

T_A = Timer (16-bit with capture/compare)

ADC = 14-bit A/D converter

31x + = All peripherals found on 31x family plus

MPY = Hardware Multiplier

USART = UART/SPI

MSP430 Ultra-Low-Power Microcontrollers (Continued)

Device	ROM	OTP/ EPROM	RAM	A/D	LCD Seg.	JTAG	I/O	Peripherals	Active Mode Power (3 V)	V _{CC}	Description
PMS430E315		16 KB	512B	Slope	92 Seg	Yes	16	WDT, BT, T/P, 8bT/C		2.7 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver, EPROM
MSP430C323	8 KB		256B	14-Bit	84 Seg	Yes	9	WDT, BT, T/P, 8bT/C, ADC	400 μ A	2.5 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver & 14-Bit A/D, ROM-Code
MSP430C325	16 KB		512B	14-Bit	84 Seg	Yes	9	WDT, BT, T/P, 8bT/C, ADC	400 μ A	2.5 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver & 14-Bit A/D, ROM-Code
MSP430P325		16 KB	512B	14-Bit	84 Seg	Yes	9	WDT, BT, T/P, 8bT/C, ADC	500 μ A	2.7 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver & 14-Bit A/D, One-Time-Prog
PMS430E325		16 KB	512B	14-Bit	84 Seg	Yes	9	WDT, BT, T/P, 8bT/C, ADC		2.7 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver & 14-Bit A/D, EPROM
MSP430C336	24 KB		1 KB	Slope	120 Seg	Yes	40	31x +, T_A, MPY, USART	400 μ A	2.5 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver, H/W Multiplier & USART, ROM-Code
MSP430C337	32 KB		1 KB	Slope	120 Seg	Yes	40	31x +, T_A, MPY, USART	400 μ A	2.5 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver, H/W Multiplier & USART, ROM-Code
MSP430P337		32 KB	1 KB	Slope	120 Seg	Yes	40	31x +, T_A, MPY, USART	500 μ A	2.7 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver, H/W Multiplier & USART, One-Time-Prog
PMS430E337		32 KB	1 KB	Slope	120 Seg	Yes	40	31x +, T_A, MPY, USART		2.7 to 5.5	16-Bit Ultra-Low-Power μ C with LCD Driver, H/W Multiplier & USART, EPROM

*All unused LCD segments can be used as outputs.

Peripherals Abbreviations:

WDT = Watchdog Timer (16-bit)
BT = Basic Timer (timer: one 16-bit or two 8-bit)
T/P = Timer Port (counter: one 16-bit or two 8-bit)
T/C = Interval Timer (8-bit)(serial comm, pulse counting/accum)
T_A = Timer (16-bit with capture/compare)

ADC = 14-bit A/D converter
"31x +" = All peripherals found on 31x family plus
MPY = Hardware Multiplier
USART = UART/SPI

RF Products

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RF Products	8-3

For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.

Two other resources for product information are:

- 1) the InfoNavigator CD-ROM (literature # SLYC005C)**
- 2) the Semiconductor products category at the TI web site www.ti.com**

TI's wireless RF products extend the TI advantage to every major wireless system block. In addition to providing leadership performance and multi-function RF integration with minimal power consumption, TI's wireless RF products are designed for optimal performance with TI's leadership digital and analog baseband products. Optimal performance is achieved by applying TI's established systems expertise to RF product development which results in optimal RF function partitioning and integration.

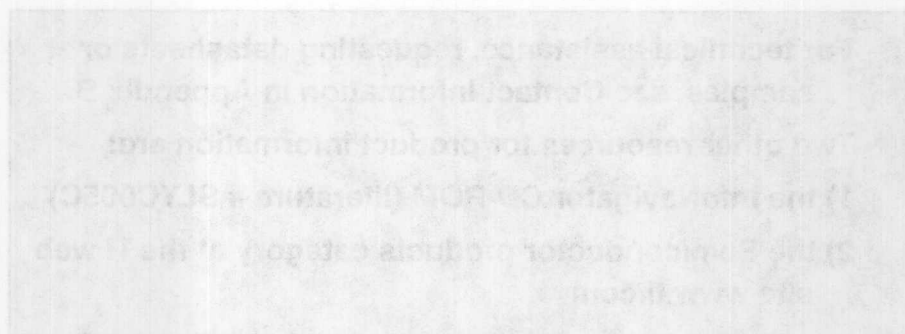
This optimal integrated performance enables comprehensive wireless digital signal processing solutions which reduce system power consumption, component count and time-to-market. TI's power-efficient RF design and manufacturing process strengths are also leveraged to ensure TI's RF product portfolio achieves leadership performance.

TI's RF product thrust is part of the Wireless Communications Business Unit's strategic focus on providing comprehensive digital signal processing solutions for wireless communications systems which enable TI's customers to be competitive in their markets. TI's wireless RF products reflect TI's continued commitment to the wireless communications market and leverages the company's established expertise in analog and mixed-signal technologies.

Web Locations for Specific Product Groups

RF Products

www.ti.com/sc/docs/products/rf/index.htm



RF Products

Device	Frequency	Standards Supported	Operating Voltage (V)	Power Output (dBm)	Package	Description
Cellular/PCS						
TRF1015	869 to 894 MHz	GSM, AMPS, IS-54/IS-136, 900-MHz Cordless	3.5 to 5.5		20-pin SSOP	RF Downconverter
TRF1020	915 to 970 MHz	GSM	2.7 to 3.5		48-pin PQFP	GSM Receiver
TRF1500	869 to 894 MHz	AMPS, IS-54/IS-136	3.6 to 4.0		48-pin TQFP	Dual-Band/Dual-Mode PCS Receiver
TRF2020	To 1.2 GHz	GSM, 900-MHz Cordless	2.75 to 4.5		20-pin TSSOP	Triple Synthesizer
TRF2050	To 1.2 GHz	AMPS, IS-54/IS-136, 900-MHz Cordless	2.9 to 5.1		20-pin TSSOP	Dual Fractional-N/Integer-N Synthesizer
TRF3520	880 to 915 MHz	GSM	2.7 to 5.5	6	48-pin PQFP	GSM Modulator/Driver Amplifier
TRF4000	1.93 to 1.99 GHz	CDMA	2.7 to 3.3		14-pin TSSOP PowerPAD	PCS RF Downconverter
TRF4002	1.85 to 1.91 GHz	CDMA	3.0 to 3.6	27.5	20-pin TSSOP PowerPAD	PCS RF Power Amplifier
TRF7003	To 1 GHz	GSM, CDMA, AMPS, IS-54/IS-136, 900-MHz Cordless	3.6 to 4.8	32	SOT-89	MOSFET Power Amplifier
TRF7610	800 to 1000 MHz	GSM	3.5 to 6.0	35	24-pin TSSOP PowerPAD	GSM Power Amplifier
TRF8010	800 to 1000 MHz	GSM, CDMA, AMPS, IS-54/IS-136, 900-MHz Cordless	3.0 to 5.0	23	20-pin TSSOP PowerPAD	900-MHz RF Transmit Driver
TRF8011	800 to 1000 MHz	GSM, CDMA, AMPS, IS-54/IS-136, 900-MHz Cordless	3.0 to 5.0	24.5	20-pin TSSOP PowerPAD	900-MHz RF Transmit Driver

Analog/DSP Compatibility Reference Guide

**For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.
For device number and package definitions, see Appendix C.**

TI is bringing DSP expertise to bear on Data Converters:

- 8-, 16-, 32-, 64-bit dynamic external bus interface
- Upgrade path to higher resolution
- Reduced power consumption
- Unique device flexibility
- DSP friendly interfaces
- Evaluation Modules and software drivers available on the Internet

Processor Power

Switch-Mode Controllers

- Hysteretic controller offers fast transient response to handle rapidly-changing load conditions
- High drive current a minimum of 2A
- Two families available (TPS5210 and TPS56xx)
- Evaluation modules, demonstration boards, and application notes available
- PowerPAD™ packaging available to significantly improve thermal characteristics

Low Dropout Regulators (LDOs)

- Large LDO portfolio designed to support the 'C6000, with roadmap to even more choices depending on application need
- Broad range of LDOs for those low-to-moderate current requirement applications

Supply Voltage Supervisors (SVS)

- Dual SVSs designed to support both the 'C6000's core and I/O voltage rails
- Added level of system integrity and control

Analog-to-Digital Converters for the TMS320C6000 DSP**

ADC	Resolution	Conversion Rate	Power (mW)	Parallel or Serial	No. of Inputs	Supply Voltage (V)	\$US/1KU*
TLC876*	10 bits	20 MSPS	107	P	1	3/5	3.68
TLC2554*	12 bits	400 kSPS	9.5	S	4	5	4.40
TLC2558*	12 bits	400 kSPS	9.5	S	8	5	4.62
TLV1543	10 bits	38 kSPS	4	S	11	3.3	1.58
TLV1544*	10 bits	85 kSPS	3	S	4	5	1.84
TLV1548*	10 bits	85 kSPS	3	S	8	3/5	2.73
TLV1570*	10 bits	1.25 MSPS	8	S	8	3/5	3.70
TLV1571	10 bits	1.25 MSPS	12	P	1	3/5	3.50
TLV1572*	10 bits	1.25 MSPS	8	S	1	3/5	3.20
TLV1578	10 bits	1.25 MSPS	12	P	8	3/5	3.92
TLV2543*	12 bits	66 kSPS	3.3	S	11	3.3	4.20
TLV2544*	12 bits	200 kSPS	5.5	S	4	3/5	4.30
TLV2548*	12 bits	200 kSPS	5.5	S	8	3/5	4.52
TLV5510*	8 bits	10 MSPS	40	P	1	3.3	2.03
TLV5580*	8 bits	80 MSPS	240	P	1	3.3	5.47
THS1206	12 bits	6 MSPS	210	P	4	3/5	13.00

* To order any of the EVM kits, please call our toll-free order desk number 1-800-477-8924, ext. 5800 in North America. To order in Europe, Asia and other regions, contact the TI Product Information Center for your country as listed at the end of Appendix B.

Or, contact your local TI distributor; see www.ti.com/sc/docs/dist-menu.htm for distributor listings.

** Compatibility analysis based on 'C6201B

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Digital-to-Analog Converters for the TMS320C6000 DSP**

DAC	Resolution	Settling Time (μs)	Power (mW) typ.	Parallel or Serial	Supply Voltage (V)	Output (V or I)	No. of DACs	\$US/1KU*
TLV5604	10 bits	3-9	9	S	3/5	V	4	4.90
TLV5614	12 bits	3-9	9.6	S	3/5	V	4	9.50
TLV5616	12 bits	3-9	2.1	S	3/5	V	1	3.15
TLV5619	12 bits	1	4.5	P	3/5	V	1	4.25
TLV5636	12 bits	1	10	S	3/5	V	1	4.31
TLV5637	10 bits	1	15	S	3/5	V	2	4.60
TLV5638	12 bits	1	15	S	3/5	V	2	5.50
TLV5639	12 bits	1	18	P	3/5	V	1	4.50
THS5641	8 bits	100 MSPS	175	P	3/5	I	1	4.25
THS5651	10 bits	100 MSPS	175	P	3/5	I	1	7.25
THS5661	12 bits	100 MSPS	175	P	3/5	I	1	13.25
THS8133	10 bits	80 MSPS	525	P	3/5	I	3	8.50
THS8134	8 bits	80 MSPS	525	P	3/5	I	3	6.50

** Compatibility analysis based on 'C6201B

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Codecs for the TMS320C6000 DSPs

Part Number	Resolution Bits	Low Pass Filter (3 dB) (kHz)	Sampling Rate (Max) (SPS)	Supply Voltage Analog (V)	Supply Voltage Digital (V)	Parallel or Serial	Power Dissipation (mW)
TLC320AD50	16	9.92	22.05 k	+5	+5/+3.3	Serial	120
TLC320AD52	16	9.92	22.05 k	+5	+5/+3.3	Serial	120
TLC320AD56	16	8.82	22.05 k	+5	+5/+3.3	Serial	100
TLC320AD535	16	4.96	11.025 k	+5/+3.3	+5/+3.3	Serial	240
TLC320AD545	16	4.96	11.025 k	+5/+3.3	+5/+3.3	Serial	120
TLV320AD543	16	4.96	11.025 k	+3	+3	Serial	90
TLV320AD11A	14	138 (Tx) 1104 (Rx)	2.2 or 4.4 MSPS Selectable	+3.3	+3.3	Parallel (Data) Serial (Control)	650
TLV320AD12A	14	1104 (Tx) 138 (Rx)	2.2 or 4.4 MSPS Selectable	+3.3	+3.3	Parallel (Data) Serial (Control)	600
TLFD500*	14	138 (Tx) 552 (Rx)	4416 k	+3.3	+3.3	Serial	700

*Complies with ITU G.992.2 standard

Power Management Products for the TMS320C6000 DSP

						Supply Current						
DSP Family	Supply Voltage @ Typ I		SVS	\$US/1KU	DSP Only	\$US/1KU	≤ 500 mA	\$US/1KU	≤ 1 A	\$US/1KU	> 1 A	\$US/1KU
TMS320C6201	2.5-V core	2.5 A @ 200 MHz	TPS3305-25	1.51	TPS5602	4.77	N/A		N/A		TPS5602	4.77
	3.3-V I/O	150 mA @ 200 MHz	(dual)		(dual)		TPS7133	1.01	TPS76733	1.99	(dual)	
TMS320C6201B	1.8-V core	830 mA @ 200 MHz	TPS3305-18	1.51	TPS767D318	3.00	N/A		TPS767D318	3.00	TPS5602	4.77
	3.3-V I/O	150 mA @ 200 MHz	(dual)		(dual)		TPS7133	1.01	(dual)		(dual)	
TMS320C6202	1.8-V core	1.4 A @ 250 MHz	TPS3305-18	1.51	TPS5602	4.77	N/A		N/A		TPS5602	4.77
	3.3-V I/O	190 mA @ 250 MHz	(dual)		(dual)		TPS7133	1.01	TPS76733	1.99	(dual)	
TMS320C6211	1.8-V core	830 mA @ 150 MHz	TPS3305-18	1.51	TPS767D318	3.00	N/A		TPS767D318	3.00	TPS5602	4.77
	3.3-V I/O	100 mA @ 150 MHz	(dual)		(dual)		TPS7133	1.01	(dual)		(dual)	
TMS320C6701	1.8-V core	830 mA @ 167 MHz	TPS3305-18	1.51	TPS767D318	3.00	N/A		TPS767D318	3.00	TPS5602	4.77
	3.3-V I/O	200 mA @ 167 MHz	(dual)		(dual)		TPS7133	1.01	(dual)		(dual)	

* See application notes: Buck Converter, Selectable Using the TL5001 (SLVP097), Low-Cost Power Solution for TMS320C6201 DSP Applications (SLVA046), 3.3-V Output Buck Converter - TL5001 (SLVP101), 2.5-V Output Buck Converter - TL5001 (SLVP102), 1.8-V Output Buck Converter - TL5001 (SLVP103).

** See application note: Fast Response Synchronous Buck Converter Design Using the TI TPS56xx Family of Ripple Regulator Controllers (SLVU007).

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

To order free Data Converter or Power Supply samples, go to www.ti.com/sc/docs/msp/c6000.htm

TI's Data Converter products are optimized for easy interface to TMS320 DSPs.

Our Analog-to-Digital and Digital-to-Analog converters cover applications such as:

- Audio
- Graphics
- Communications
- Modems
- Cellular phones
- Video capture and digital imaging
- Industrial control and disk-drive servo-loop control
- Automotive
- Electronic instrumentation
- Digital audio
- Any DSP-based system

Processor Power

Switch-Mode Controllers

- Hysteretic controller offers fast transient response to handle rapidly-changing load conditions
- High drive current a minimum of 2A
- Two families available (TPS5210 and TPS56xx)
- Evaluation modules, demonstration boards, and application notes available
- PowerPAD™ packaging available to significantly improve thermal characteristics

Low Dropout Regulators (LDOs)

- Large LDO portfolio designed to support the 'C5000, with roadmap to even more choices depending on application need
- Broad range of LDOs for those low-to-moderate current requirement applications

Supply Voltage Supervisors (SVS)

- Dual SVSs designed to support both the 'C5000's core and I/O voltage rails
- Added level of system integrity and control

Analog-to-Digital Converters for the TMS320C5000 DSP

ADC	Resolution	Conversion Rate	Power (mW)	Parallel or Serial	No. of Inputs	Supply Voltage (V)	\$US/1KU*
TLC876*	10 bits	20 MSPS	107	P	1	3/5	3.68
TLC1550	10 bits	164 kSPS	10	P	1	5	4.73
TLC1551	10 bits	164 kSPS	10	P	1	5	3.41
TLC2543*	12 bits	66 kSPS	5	S	11	5	3.68
TLC2554*	12 bits	400 kSPS	9.5	S	4	5	4.40
TLC2558*	12 bits	400 kSPS	9.5	S	8	5	4.62
TLC5510*	8 bits	20 MSPS	90	P	1	5	2.05
TLC5540*	8 bits	40 MSPS	85	P	1	5	3.36
TLV1544*	10 bits	85 kSPS	3	S	4	5	1.84
TLV1548*	10 bits	85 kSPS	3	S	8	3/5	2.73
TLV1570*	10 bits	1.25 MSPS	8	S	8	3/5	3.70
TLV1571	10 bits	1.25 MSPS	12	P	1	3/5	3.50
TLV1572*	10 bits	1.25 MSPS	8	S	1	3/5	3.20
TLV1578	10 bits	1.25 MSPS	12	P	8	3/5	3.92
TLV2543*	12 bits	66 kSPS	3.3	S	11	3.3	4.20
TLV2544*	12 bits	200 kSPS	5.5	S	4	3/5	4.30
TLV2548*	12 bits	200 kSPS	5.5	S	8	3/5	4.52
TLV5510*	8 bits	10 MSPS	40	P	1	3.3	2.03
TLV5580*	8 bits	80 MSPS	240	P	1	3.3	5.47
THS1206	12 bits	6 MSPS	210	P	4	3/5	13.00

* To order any of the EVM kits, please call our toll-free order desk number 1-800-477-8924, ext. 5800 in North America. To order in Europe, Asia and other regions, contact the TI Product Information Center for your country as listed at the end of Appendix B.

Or, contact your local TI distributor; see www.ti.com/sc/docs/dist-menu.htm for distributor listings.

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Digital-to-Analog Converters for the TMS320C5000 DSP

DAC	Resolution	Settling Time (μs)	Power (mW) typ.	Parallel or Serial	Supply Voltage (V)	Output (V or I)	No. of DACs	\$US/1KU*
TLC5617A	10 bits	2.5–12.5	8.8	S	5	V	2	3.44
TLC5618A	12 bits	2.5–12.5	8.8	S	5	V	2	4.20
TLC7225	8 bits	5	75	S	5/15	V	4	3.58
TLC7226	8 bits	5	96	S	15	V	4	1.68
TLC7524	8 bits	0.1	5	S	5/15	I	1	1.26
TLC7528	8 bits	0.1	10	S	5/15	I	2	1.39
TLC7628	8 bits	0.1	20	P	11/15	I	2	1.52
TLV5604	10 bits	3–9	9	S	3/5	V	4	4.90
TLV5614	12 bits	3–9	9.6	S	3/5	V	4	9.50
TLV5616	12 bits	3–9	2.1	S	3/5	V	1	3.15
TLV5619	12 bits	1	4.5	P	3/5	V	1	4.25
TLV5636	12 bits	1	10	S	3/5	V	1	4.31
TLV5637	10 bits	1	15	S	3/5	V	2	4.60
TLV5638	12 bits	1	15	S	3/5	V	2	5.50
TLV5639	12 bits	1	18	P	3/5	V	1	4.50
THS5641	8 bits	100 MSPS	175	P	3/5	I	1	4.25
THS5651	10 bits	100 MSPS	175	P	3/5	I	1	7.25
THS5661	12 bits	100 MSPS	175	P	3/5	I	1	13.25
THS8133	10 bits	80 MSPS	525	P	3/5	I	3	8.50
THS8134	8 bits	80 MSPS	525	P	3/5	I	3	6.50

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Codecs for the TMS320C5000 DSPs

Part Number	Resolution Bits	Band Pass Filter (3 dB) (kHz)	Sampling Rate (Max) (SPS)	Supply Voltage Analog (V)	Supply Voltage Digital (V)	Parallel or Serial	Power Dissipation (mW)
TLC320AD50	16	up to 9.92	22.05 k	+5	+5/+3.3	Serial	120
TLC320AD52	16	up to 9.92	22.05 k	+5	+5/+3.3	Serial	120
TLC320AD56	16	up to 8.82	22.05 k	+5	+5/+3.3	Serial	100
TLC320AD535	16	up to 4.96	11.025 k	+5/+3.3	+5/+3.3	Serial	240
TLC320AD545	16	up to 4.96	11.025 k	+5/+3.3	+5/+3.3	Serial	120
TLV320AD543	16	up to 4.96	11.025 k	+3	+3	Serial	90
TLC320AC01	14	up to 10.8	25 k	+5	+5	Serial	100
TLC320AC02	14	up to 10.8	25 k	+5	+5	Serial	100
TLV320AD11A	14	138 (Tx) 1104 (Rx)	2.2 or 4.4 MSPS Selectable	+3.3	+3.3	Parallel (Data) Serial (Control)	650
TLV320AD12A	14	1104 (Tx) 138 (Rx)	2.2 or 4.4 MSPS Selectable	+3.3	+3.3	Parallel (Data) Serial (Control)	600
TLFD500*	14	138 (Tx) 552 (Rx)	4416 k	+3.3	+3.3	Serial	700

*Complies with ITU G.992.2 standard

Power Management Products for the TMS320C5000 DSP

DSP Family	Supply Voltage @ Typ I	SVS	\$US/1KU	Supply Current							
				DSP Only	\$US/1KU	≤ 500 mA	\$US/1KU	≤ 1 A	\$US/1KU	> 1 A	\$US/1KU*
TMS320C541B	5 V	47 mA @ 40 MHz	TPS3823-50	0.92	TPS76350	0.49	TPS7150	1.01	TPS76750	1.99	N/A
TMS320LC541	3.3 V	50 mA @ 50 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320C542	5 V	47 mA @ 40 MHz	TPS3823-50	0.92	TPS76350	0.49	TPS7150	1.01	TPS76750	1.99	N/A
TMS320LC542	3.3 V	50 mA @ 50 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320LC543	3.3 V	50 mA @ 50 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320LC545A	3.3 V	66 mA @ 66 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320LC546A	3.3 V	66 mA @ 66 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320LC548	3.3 V	80 mA @ 80 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320LC549	3.3 V	80 mA @ 80 MHz	TPS3823-33	0.92	TPS76333	0.49	TPS7133	1.01	TPS76733	1.99	TPS56100 3.71
TMS320VC549	2.5-V core	50 mA @ 100 MHz	TPS3305-25	1.51	TPS76325	0.49	TPS71025	0.90	TPS767D325	3.00	TPS5602 4.77
	3.3-V I/O	30 mA @ 100 MHz	(dual)		TPS76333	0.49	TPS7133	1.01	(dual)	(dual)	
TMS320VC5402	1.8-V core	33 mA @ 100 MHz	TPS3305-18	1.51	TPS76318	0.49	TPS7101	1.01	TPS767D318	3.00	TPS5602 4.77
	3.3-V I/O	30 mA @ 100 MHz	(dual)		TPS76333	0.49	TPS7133	1.01	(dual)	(dual)	
TMS320VC5410	2.5-V core	50 mA @ 100 MHz	TPS3305-25	1.51	TPS76325	0.49	TPS71025	0.90	TPS767D325	3.00	TPS5602 4.77
	3.3-V I/O	30 mA @ 100 MHz	(dual)		TPS76333	0.49	TPS7133	1.01	(dual)	(dual)	
TMS320VC5420	1.8-V core	99 mA @ 100 MHz	TPS3305-18	1.51	TPS76318	0.49	TPS73H018	2.66	TPS767D318	3.00	TPS5602 4.77
	3.3-V I/O	30 mA @ 100 MHz	(dual)		TPS76333	0.49	TPS7133	1.01	(dual)	(dual)	

* See application notes: Buck Converter, Selectable Using the TL5001 (SLVP097), Low-Cost Power Solution for TMS320C6201 DSP Applications (SLVA046), 3.3-V Output Buck Converter - TL5001 (SLVP101), 2.5-V Output Buck Converter - TL5001 (SLVP102), 1.8-V Output Buck Converter - TL5001 (SLVP103).

** See application note: Fast Response Synchronous Buck Converter Design Using the TI TPS56xx Family of Ripple Regulator Controllers (SLVU007).

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

TI DSP and TI Advanced Analog Products = World's Leading Digital Signal Processing Solutions

Our products offer a range of interface options and are also available in supply voltages ranging from 2.7V to 15V.

Processor Power

Switch-Mode Controllers

- Hysteretic controller offers fast transient response to handle rapidly-changing load conditions
- High drive current a minimum of 2A
- Two families available (TPS5210 and TPS56xx)
- Evaluation modules, demonstration boards, and application notes available
- PowerPAD™ packaging available to significantly improve thermal characteristics

Low Dropout Regulators (LDOs)

- Large LDO portfolio designed to support the 'C2000, with roadmap to even more choices depending on application need
- Broad range of LDOs for those low-to-moderate current requirement applications

Supply Voltage Supervisors (SVS)

- Dual SVSs designed to support both the 'C2000's core and I/O voltage rails
- Added level of system integrity and control

Analog-to-Digital Converters for the TMS320C2000 DSP

ADC	Resolution	Conversion Rate	Power (mW)	Parallel or Serial	No. of Inputs	Supply Voltage (V)	\$US/1KU**
TLC540*	8 bits	75 kSPS	6	S	11	5	1.70
TLC541*	8 bits	40 kSPS	6	S	11	5	1.36
TLC542*	8 bits	25 kSPS	6	S	11	5	1.31
TLC545*	8 bits	76 kSPS	6	S	19	5	2.77
TLC546*	8 bits	40 kSPS	6	S	19	5	3.09
TLC548*	8 bits	45 kSPS	8	S	1	5	1.05
TLC549*	8 bits	40 kSPS	8	S	1	5	0.74
TLC876*	10 bits	20 MSPS	107	P	1	3/5	3.68
TLC1541*	10 bits	32 kSPS	6	S	11	5	2.65
TLC1542*	10 bits	38 kSPS	4	S	11	5	2.36
TLC1543*	10 bits	38 kSPS	4	S	11	5	1.58
TLC1549*	10 bits	38 kSPS	4	S	11	5	1.42
TLC1550	10 bits	164 kSPS	10	P	1	5	4.73
TLC1551	10 bits	164 kSPS	10	P	1	5	3.41
TLC2543*	12 bits	66 kSPS	5	S	11	5	3.68
TLC2554*	12 bits	400 kSPS	9.5	S	4	5	4.40
TLC2558*	12 bits	400 kSPS	9.5	S	8	5	4.62
TLC5510*	8 bits	20 MSPS	90	P	1	5	2.05
TLC5540*	8 bits	40 MSPS	85	P	1	5	3.36
TLV1543*	10 bits	38 kSPS	4	S	11	3.3	2.26
TLV1544*	10 bits	85 kSPS	3	S	4	5	1.84
TLV1548*	10 bits	85 kSPS	3	S	8	3/5	2.73
TLV1570	10 bits	1.25 MSPS	8	S	8	3/5	3.70
TLV1571	10 bits	1.25 MSPS	12	P	1	3/5	3.50
TLV1572*	10 bits	1.25 MSPS	8	S	1	3/5	3.20
TLV1578	10 bits	1.25 MSPS	12	P	8	3/5	3.92
TLV2543*	12 bits	66 kSPS	3.3	S	11	3.3	4.20
TLV2544*	12 bits	200 kSPS	5.5	S	4	3/5	4.30
TLV2548*	12 bits	200 kSPS	5.5	S	8	3/5	4.52
TLV5510*	8 bits	10 MSPS	40	P	1	3.3	2.03
TLV5580*	8 bits	80 MSPS	240	P	1	3.3	5.47
THS1206	12 bits	6 MSPS	210	P	4	3/5	13.00

* To order any of the EVM kits, please call our toll-free order desk number 1-800-477-8924, ext. 5800 in North America. To order in Europe, Asia and other regions, contact the TI Product Information Center for your country as listed at the end of Appendix B.

Or, contact your local TI distributor; see www.ti.com/sc/docs/dist-menu.htm for distributor listings.

* Only compatible with 'C24x

** Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Digital-to-Analog Converters for the TMS320C2000 DSP

DAC	Resolution	Settling Time (μs)	Power (mW) typ.	Parallel or Serial	Supply Voltage (V)	Output (V or I)	No. of DACs	\$US/1KU*
TLC5615*	10 bits	12.5	1.3	S	5	V	1	1.76
TLC5617A	10 bits	2.5–12.5	8.8	S	5	V	2	3.44
TLC5618A	12 bits	2.5–12.5	8.8	S	5	V	2	4.20
TLC7225	8 bits	5	75	S	5/15	V	4	3.58
TLC7226	8 bits	5	96	S	15	V	4	1.68
TLC7524	8 bits	0.1	5	S	5/15	I	1	1.26
TLC7528	8 bits	0.1	10	S	5/15	I	2	1.39
TLC7628	8 bits	0.1	20	P	11/15	I	2	1.52
TLV5604	10 bits	3–9	9	S	3/5	V	4	4.90
TLV5614	12 bits	3–9	9.6	S	3/5	V	4	9.50
TLV5616	12 bits	3–9	2.1	S	3/5	V	1	3.15
TLV5619	12 bits	1	4.5	P	3/5	V	1	4.25
TLV5636	12 bits	1	10	S	3/5	V	1	4.31
TLV5637	10 bits	1	15	S	3/5	V	2	4.60
TLV5638	12 bits	1	15	S	3/5	V	2	5.50
TLV5639	12 bits	1	18	P	3/5	V	1	4.50
THS8133	10 bits	80 MSPS	525	P	3/5	I	3	8.50
THS8134	8 bits	80 MSPS	525	P	3/5	I	3	6.50

* Only compatible with 'C24x

* Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Codecs for the TMS320C2000 DSPs

Part Number	Resolution Bits	Band Pass Filter (3 dB) (kHz)	Sampling Rate (Max) (kSPS)	Supply Voltage Analog (V)	Supply Voltage Digital (V)	Parallel or Serial	Power Dissipation (mW)
TLC320AD50	16	up to 9.92	22.05	+5	+5/+3.3	Serial	120
TLC320AD52	16	up to 9.92	22.05	+5	+5/+3.3	Serial	120
TLC320AD56	16	up to 8.82	22.05	+5	+5/+3.3	Serial	100
TLC320AD535	16	up to 4.96	11.025	+5/+3.3	+5/+3.3	Serial	240
TLC320AD545	16	up to 4.96	11.025	+5/+3.3	+5/+3.3	Serial	120
TLV320AD543	16	up to 4.96	11.025	+3	+3	Serial	90
TLC320AC01	14	up to 10.8	25	+5	+5	Serial	100
TLC320AC02	14	up to 10.8	25	+5	+5	Serial	100

Power Management Products for the TMS320C2000 DSP

DSP Family	Supply Voltage @ Typ I		SVS \$US/1KU		Supply Current					
					DSP Only \$US/1KU	≤ 500 mA \$US/1KU	≤ 1 A \$US/1KU	> 1 A \$US/1KU		
TMS320C203-80	5 V	76 mA @ 40 MHz	TPS3823-50	0.92	TPS76350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320LC203-40	3.3 V	22 mA @ 20 MHz	TPS3823-33	0.92	TPS76333 0.49	TPS7133 1.01	TPS76733 1.99	TPS56100 3.71		
TMS320C206-40	3.3-V core	44 mA @ 40 MHz	TPS3305-33 (dual)	0.92	TPS76333 0.49	TPS7133 1.01	TPS767D325 3.00	TPS56100 3.71		
	5-V I/O	76 mA @ 40 MHz			TPS76350 0.49	TPS7150 1.01	(dual)			
TMS320LC206-40	3.3 V	44 mA @ 40 MHz	TPS3823-33	0.92	TPS76333 0.49	TPS7133 1.01	TPS76733 1.99	TPS56100 3.71		
TMS320F206	5 V	76 mA @ 20 MHz	TPS3823-50	0.92	TPS76350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320C209-57	5 V	32 mA @ 28.5 MHz	TPS3823-50	0.92	TPS76350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320C240	5 V	80 mA @ 20 MHz	TPS3823-50	0.92	TPS7350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320F240	5 V	80 mA @ 20 MHz	TPS3823-50	0.92	TPS7350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320C241	5 V	80 mA @ 20 MHz	TPS3823-50	0.92	TPS7350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320F241	5 V	80 mA @ 20 MHz	TPS3823-50	0.92	TPS7350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320C242	5 V	80 mA @ 20 MHz	TPS3823-50	0.92	TPS7350 0.49	TPS7150 1.01	TPS76760 1.99			
TMS320F243	5 V	80 mA @ 20 MHz	TPS3823-50	0.92	TPS7350 0.49	TPS7150 1.01	TPS76760 1.99			

* See application notes: SLVP097, SLVA046, SLVP101, SLVP102, SLVP103.

** See application note: SLVU007.

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

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Processor Power

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- Hysteretic controller offers fast transient response to handle rapidly-changing load conditions
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- PowerPAD™ packaging available to significantly improve thermal characteristics

Low Dropout Regulators (LDOs)

- Large LDO portfolio designed to support the 'C3x, with roadmap to even more choices depending on application need
- Broad range of LDOs for those low-to-moderate current requirement applications

Supply Voltage Supervisors (SVS)

- Dual SVSs designed to support both the 'C3x's core and I/O voltage rails
- Added level of system integrity and control

Analog-to-Digital Converters for the TMS320C3x DSP

ADC	Resolution	Conversion Rate	Power (mW)	Parallel or Serial	No. of Inputs	Supply Voltage (V)	\$US/1KU ¹
TLC876*	10 bits	20 MSPS	107	P	1	3/5	3.68
TLC1550	10 bits	164 kSPS	10	P	1	5	4.73
TLC1551	10 bits	164 kSPS	10	P	1	5	3.41
TLC2543*	12 bits	66 kSPS	5	S	11	5	3.68
TLC2554*	12 bits	400 kSPS	9.5	S	4	5	4.40
TLC2558*	12 bits	400 kSPS	9.5	S	8	5	4.62
TLC5510*	8 bits	20 MSPS	90	P	1	5	2.05
TLC5540*	8 bits	40 MSPS	85	P	1	5	3.36
TLV1543	10 bits	38 kSPS	4	S	11	3.3	2.26
TLV1544*	10 bits	85 kSPS	3	S	4	5	1.84
TLV1548*	10 bits	85 kSPS	3	S	8	3/5	2.73
TLV1570*	10 bits	1.25 MSPS	8	S	8	3/5	3.70
TLV1571	10 bits	1.25 MSPS	12	P	1	3/5	3.50
TLV1572*	10 bits	1.25 MSPS	8	S	1	3/5	3.20
TLV1578	10 bits	1.25 MSPS	12	P	8	3/5	3.92
TLV2543*	12 bits	66 kSPS	3.3	S	11	3.3	4.20
TLV2544*	12 bits	200 kSPS	5.5	S	4	3/5	4.30
TLV2548*	12 bits	200 kSPS	5.5	S	8	3/5	4.52
TLV5510*	8 bits	10 MSPS	40	P	1	3.3	2.03
TLV5580	8 bits	80 MSPS	240	P	1	3.3	5.47
THS1206	12 bits	6 MSPS	210	P	4	3/5	13.00

* To order any of the EVM kits, please call our toll-free order desk number 1-800-477-8924, ext. 5800 in North America. To order in Europe, Asia and other regions, contact the TI Product Information Center for your country as listed at the end of Appendix B.

Or, contact your local TI distributor; see www.ti.com/sc/docs/dist-menu.htm for distributor listings.

¹Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Digital-to-Analog Converters for the TMS320C3x DSP

DAC	Resolution	Settling Time (μs)	Power (mW) typ.	Parallel or Serial	Supply Voltage (V)	Output (V or I)	No. of DACs	\$US/1KU ¹
TLC5617A	10 bits	2.5–12.5	8.8	S	5	V	2	3.44
TLC5618A	12 bits	2.5–12.5	8.8	S	5	V	2	4.20
TLC7225	8 bits	5	75	S	5/15	V	4	3.58
TLC7226	8 bits	5	96	S	15	V	4	1.68
TLC7524	8 bits	0.1	5	S	5/15	I	1	1.26
TLC7528	8 bits	0.1	10	S	5/15	I	2	1.39
TLC7628	8 bits	0.1	20	P	11/15	I	2	1.52
TLV5604	10 bits	3–9	9	S	3/5	V	4	4.90
TLV5614	12 bits	3–9	9.6	S	3/5	V	4	9.50
TLV5616	12 bits	3–9	2.1	S	3/5	V	1	3.15
TLV5619	12 bits	1	4.5	P	3/5	V	1	4.25
TLV5636	12 bits	1	10	S	3/5	V	1	4.31
TLV5637	10 bits	1	15	S	3/5	V	2	4.60
TLV5638	12 bits	1	15	S	3/5	V	2	5.50
TLV5639	12 bits	1	18	P	3/5	V	1	4.50
THS8133	10 bits	80 MSPS	525	P	3/5	I	3	8.50
THS8134	8 bits	80 MSPS	525	P	3/5	I	3	6.50

¹Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

Codecs for the TMS320C3x DSPs

Part Number	Resolution Bits	Band Pass Filter (3 dB) (kHz)	Sampling Rate (Max) (kSPS)	Supply Voltage Analog (V)	Supply Voltage Digital (V)	Parallel or Serial	Power Dissipation (mW)
TLC320AD50	16	up to 9.92	22.05	+5	+5/+3.3	Serial	120
TLC320AD52	16	up to 9.92	22.05	+5	+5/+3.3	Serial	120
TLC320AD56	16	up to 8.82	22.05	+5	+5/+3.3	Serial	100
TLC320AD535	16	up to 4.96	11.025	+5/+3.3	+5/+3.3	Serial	240
TLC320AD545	16	up to 4.96	11.025	+5/+3.3	+5/+3.3	Serial	120
TLV320AD543	16	up to 4.96	11.025	+3	+3	Serial	90
TLC320AC01	14	up to 10.8	25	+5	+5	Serial	100
TLC320AC02	14	up to 10.8	25	+5	+5	Serial	100

Power Management Products for the TMS320C3x DSP

DSP Family	Supply Voltage @ Typ I		SVS	\$US/1KU	Supply Current					
					DSP Only	\$US/1KU	≤ 500 mA	\$US/1KU	≤ 1 A	\$US/1KU
TMS320C3x	5 V	47 mA	TPS3823-50	0.92	TPS76350	0.49	TPS7150	1.01	TPS76750	1.99
TMS320VC33-120	1.8-V core	20 mA @ 120 MHz	TPS3305-18	1.51	TPS76318	0.49	TPS7101	1.01	TPS767D318	3.00
	3.3-V I/O	40 mA @ 120 MHz	(dual)		TPS76333	0.49	TPS7133	1.01	(dual)	(dual)
TMS320VC33-150	1.8-V core	25 mA @ 150 MHz	TPS3305-18	1.51	TPS76318	0.49	TPS7101	1.01	TPS767D318	3.00
	3.3-V I/O	45 mA @ 150 MHz	(dual)		TPS76333	0.49	TPS7133	1.01	(dual)	(dual)

* See application notes: *Buck Converter*, *Selectable Using the TL5001 (SLVP097)*, *Low-Cost Power Solution for TMS320C6201 DSP Applications (SLVA046)*, *3.3-V Output Buck Converter - TL5001 (SLVP101)*, *2.5-V Output Buck Converter - TL5001 (SLVP102)*, *1.8-V Output Buck Converter - TL5001 (SLVP103)*.

*Prices are quoted in U.S. dollars and represent 1999 suggested resale pricing.

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www.ti.com/sc/docs/msp/c3x.htm

Part Number	Input Voltage Range	Output Voltage	Output Current	Efficiency	Quiescent Current	Operating Temperature
TPS23020	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23021	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23022	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23023	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23024	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23025	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23026	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23027	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23028	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23029	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23030	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C

Part Number	Input Voltage Range	Output Voltage	Output Current	Efficiency	Quiescent Current	Operating Temperature
TPS23031	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23032	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23033	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23034	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23035	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23036	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23037	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23038	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23039	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C
TPS23040	up to 4.5V	1.8V	1.0A	85%	100µA	-40 to 125°C

For application notes, back converter selection using the TPS23020/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40, please refer to the TPS23020/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40 Application Report (SVA001) or the TPS23020/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40 Application Report (SVA002).

For more information on Power Management Products, go to www.ti.com/power.

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**For part number ordering information, see Appendix C.
Refer to Appendix D for a device index that includes
literature and package information by device.**

Resources & Contact Information

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To order any of the following literature or tools by phone, contact the nearest Product Information Center listed at the end of this appendix. Additional information and email contact options for Analog & Mixed-Signal Products are available at the Tools & Design Assistance web site www.ti.com/sc/docs/msp/tools/tools.htm .	
DATA BOOKS	
Data Acquisition Circuits, 1998	SLAD001A
Data Transmission Circuits—Line Circuits, 1998	SLLD001B
Data Transmission Circuits—Communications Controllers, 1996 ..	SLLD003
MSP430 Family Architecture Guide and Module Library	SLAUE10B
Operational Amplifiers and Comparators Vol A, 1997	SLYD011A
Operational Amplifiers and Comparators Vol B, 1997	SLYD012A
Power Supply Circuits Data Book, Vol. A, 1999	SLVD003
Power Supply Circuits Data Book, Vol. B, 1999	SLVD004
Power Supply Circuits Data Book, Vol. C, 1999	SLVD005
Linear Circuits Power+™ Products Peripheral Drivers/ Actuators, 1996	SLYD010A
Semiconductor Group Package Outlines Reference Guide, 1998 ..	SSYU001D
Wireless & Telecommunications Products, 1996	SLWD001
SELECTION GUIDES	
Audio Power Amplifiers Sine On, 1999	SLYM027
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Low Dropout Regulators Sine On, 1999	SLYM042
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Power and Controls Sine On, 1999	SLYM041
Power Distribution Sine On, 1999	SLYM026A
Supply Voltage Supervisors Sine On, 1999	SLVB005A
Excalibur Op Amp Selection Guide, May '97	SLVB001B
MSP430 Ultra-Low-Power Microcontrollers, 2Q-1999	SLAB034A
3-V Voltage Regulators Selection Guide, Mar '96	SLVB002
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PowerPAD Thermally Enhanced Package Application Report	SLMA002
Effect of Parasitic Capacitance in Op Amp Circuits	SLOA013

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Understanding Operational Amplifier Specifications	SLOA011
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Effect of Parasitic Capacitance in Op Amp Circuits	SLOA013
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Adjustable Boost Converter EVM using the TL5001 PWM Controller	SLVU004
Dual Power Supplies for the 'C549	SPRA280
Understanding Buck Power Stages in Switchmode Power Supplies	SLVA057
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PowerPAD Thermally Enhanced Package Application Report	SLMA002
High-Performance VRM Using the TPS5210	SLVU011
TPS3305 and TPS3307 Supervising DSP and Processor Applications	SLVA056
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TPS2205/TPS2211 PC Card Power Interface Switch	SLVA053
USB Power Distribution Using the TPS2014 and TPS2015 Power Distribution Switches	SLVA037
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TLC320AD57C Sigma-Delta Stereo A-D Application Report	SLAA010
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Signal Acquisition and Conditioning with Low Supply Voltages	SLAA018
Interfacing the TLV1544/TLV1548 ADCs to Digital Processors	SLAA022
Interfacing the TLV1544 ADC to the TMS320C50 DSP	SLAA025A
Interfacing the TLV1572 ADC to the TMS320C203 DSP	SLAA026B
Interfacing the TLV1544 ADC to the TMS320C203 DSP	SLAA028A

Resources & Contact Information

Title	Order No.
APPLICATION NOTES (Continued)	
Data Converters (Continued)	
Interfacing the TLC5510 ADC to the TMS320C203 DSP	SLAA029
Interfacing the TLC5540 ADC to the TMS320C203-80 DSP	SLAA032
Low-Power Signal Conditioning for a Pressure Sensor	SLAA034
Switched-Capacitor ADC Analog Input Calculations	SLAA036
Interfacing the TLC5540/10 ADCs to the DSKPLUS DSP	
Starter Kit TMS320C54x	SLAAE14
TLV1544 Evaluation Module User's Guide	SLAU014
TLV1572 EVM Evaluation Module User's Guide	SLAU018
TLV1570 Evaluation Module User's Guide	SLAU024
TMS320FLEX Family Messaging System Solutions with	
Numeric Decoder Design Man	SPRA183
Minimizing Input Design Problems with the TLV5590	SWCA001
TLC5618A DAC Application Report	SLAA033
TCM38C17 Quad Combo Design Considerations	SLWA014
Line-Card Codec/Filter Combo System/Design Considerations ...	SLWA006
Low-Voltage Modem Platforms Based on TMS320LC56	BPRA049
Interfacing Two AICs to One TMS320C5x Serial Port	SPRA268
TMS320 Hardware Applications	SPRA390
Interfacing TMS320C54x DSPs to TLC320AC01/02 AICs	SPRA527
Microcontrollers	
MSP430 Application Report	SLAAE10C
Special Functions	
TL7726 Hex Clamping Circuit Application Report	SLAA004
TLC2932 PLL Application Report	SLAA011A
Multimedia	
Little/Big Endian TLC34074/6	SLAT078
DATA MANUALS	
TLC34076 Data Manual	SLAS054
TLC34076-170 Data Manual	SLAS076
TVP3010 Data Manual	SLAS082
TVP3020 Data Manual	SLAS080A
TVP3025 Data Manual	SLAS090
TVP3026 Data Manual	SLAS098B

Title	Order No.
DATA MANUALS (Continued)	
TVP3030 Data Manual	SLAS111
TVP3409 Data Manual	SLAS092
EVALUATION MODULES AND DEVELOPMENT TOOLS	
Each evaluation module (EVM) kit contains a fully-assembled evaluation board, a data sheet and a user's guide for the evaluation board. Some kits also include applications notes, plus necessary software, cables and connectors.	
To order any of the EVM kits listed, please call our toll-free order desk number, 1-800-477-8924, ext. 5800 in North America. To check availability and CE certification, and to order in Europe, Asia and other regions, contact the TI Product Information Center for your country as listed at the end of this appendix. Or, contact your local TI distributor; see www.ti.com/sc/docs/distmenu.htm for distributor listings.	
Amplifiers	
Plug-n-Play DC/DC Converter Platform	TL5001EVM-097
Microphone Mixer	MIC/MIXEREVM
Plug-n-Play Platform & Speaker	TPABASEKITEVM
THS3001: 420-MHz High-Speed Current Feedback Amplifier ..	THS3001EVM
THS4001: 270-MHz High-Speed Amplifier	THS4001EVM
THS6002: Dual Differential Line Drivers & Receivers	THS6002EVM
THS7002: Dual 70-MHz Programmable Gain Amplifier	THS7002EVM
THS6062: Low-Noise xDSL Differential Receiver	THS6062EVM
THS6022: Dual 250-mA High-Speed Amplifier	THS6022EVM
THS6012: Dual 500-mA High-Speed Amplifiers	THS6012EVM
THS4061: 180-MHz High-Speed Amplifier	THS4061EVM
THS4062: Dual 180-MHz High-Speed Amplifiers	THS4062EVM
THS4051: 70-MHz High-Speed Amplifier	THS4051EVM
THS4052: Dual 70-MHz High-Speed Amplifiers	THS4052EVM
THS4041: 180-MHz C-Stable High-Speed Amplifier	THS4041EVM
THS4042: Dual 180-MHz C-Stable High-Speed Amplifiers	THS4042EVM
THS4031: 100-MHz Low-Noise High-Speed Amplifier	THS4031EVM
THS4032: Dual 100-MHz Low-Noise High-Speed Amplifiers ..	THS4032EVM
TPA005D02: Audio Power Amplifier (APA)	TPA005D02EVM
TPA005D12: 2W Class-D Stereo APA	TPA005D12EVM
TPA005D14: 2W Class-D Stereo APA with headphone drive ..	TPA005D14EVM
TPA0102: Audio Power Amplifier	TPA0102EVM

Resources & Contact Information

Title	Order No.
EVALUATION MODULES AND DEVELOPMENT TOOLS (Continued)	
Amplifiers (Continued)	
TPA0103: Audio Power Amplifier	TPA0103EVM
TPA0112: 2W Stereo APA with Internal Gain Settings	TPA0112EVM
TPA0122: 2W Stereo APA with Internal Gain Settings	TPA0122EVM
TPA0132: 2W Stereo APA with DC Volume Control	TPA0132EVM
TPA0142: 2W Stereo APA with DC Volume Control	TPA0142EVM
TPA0152: 2W Stereo APA with Digital Volume Control	TPA0152EVM
TPA0162: 2W Stereo APA with Digital Volume Control	TPA0162EVM
TPA0202: Audio Power Amplifier	TPA0202EVM
TPA032D02: Audio Power Amplifier	TPA032D02EVM
TPA032D04: Audio Power Amplifier	TPA032D04EVM
TPA102: Audio Power Amplifier	TPA102EVM
TPA112: Audio Power Amplifier	TPA112EVM
TPA122: Audio Power Amplifier	TPA122EVM
TPA1517DWP: Audio Power Amplifier	TPA1517DWPEVM
TPA1517NE: Audio Power Amplifier	TPA1517NEEVM
TPA152: Audio Power Amplifier	TPA152EVM
TPA301: Audio Power Amplifier	TPA301EVM
TPA302: Audio Power Amplifier	TPA302EVM
TPA311: Audio Power Amplifier	TPA311EVM
TPA311MSOP: Audio Power Amplifier	TPA311MSOPEVM
TPA4860: Audio Power Amplifier	TPA4860EVM
TPA4861: Audio Power Amplifier	TPA4861EVM
TPA701: Audio Power Amplifier	TPA701EVM
TPA711: Audio Power Amplifier	TPA711EVM
TPA721: Audio Power Amplifier	TPA721EVM
Universal EVM for Operational Amplifiers	UNIV-OPAMP-1
Universal EVM for Operational Amplifiers with Shutdown	UNIV-OPAMP-2
Microprocessors	
MSP430 Starter Kit	MSP-STK430X320
MSP430x32x Evaluation Kit	MSP-EVK430X320
MSP430x33x Evaluation Kit	MSP-EVK430X330
MSP430x11x Evaluation Kit	MSP-EVK430X110
MSP430 Simulation Environment	MSP-SIM430V230
MSP430 Floating-Point Package	MSP-FPP430V400
MSP430 Programming Adapter	MSP-PRG430

Title	Order No.
EVALUATION MODULES AND DEVELOPMENT TOOLS (Continued)	
Transmitters & Receivers	
LVDS Evalutaion Kit	SN65LVDS31/32
LVDS Serdes 48 Transmitter Board	SN65LVDS9TXEVM
LVDS Serdes 48 Receiver Board	SN65LVDS9RXEVM
TIR2000: Interface TIR2000 4-MBPS IrDA Evaluation Module	TIR2000EVM
Data Converters	
TLC2543: 5 V, 12-Bit ADC	TLC2543EVM
TLV2544: 12-Bit, 200-kSPS ADC	TLV2544EVM
TLC2932: 50 MHz Phase-Locked Loop	TLC2932EVM
TLC5510: 8-Bit, 40-MSPS ADC	TLC5510EVM
TLC5540: 8-Bit, 40-MSPS ADC	TLC5540EVM
TLC876: 10-Bit, 20 MHz ADC	TLC876EVM
TLV1544/8: 10-Bit, 85-kSPS, ADC	TLV1544EVM
TLV1562: 10/8/4-Bit, 2/3/7-MSPS, Reprogrammable ADC	TLV1562EVM
TLV1570: 10-Bit, 8-Channel, 1.25-MSPS ADC	TLV1570EVM
TLV1572: 10-Bit, 1.25-MSPS ADC	TLV1570EVM
TLV2543: 3 V, 12-Bit ADC	TLV2543EVM
TLV5510: Low-Voltage Version of TLC5510	TLV5510EVM
TLV5540: Low-Voltage Version of TLC5540	TLV5540EVM
Advanced Bus Solutions	
PCI1210: PCI Single-Socket CardBus Controller	PCI1210EVM
PCI1220: PCI Dual-Socket CardBus with External ZV	PCI1220EVM
PCI1221: PCI Dual-Socket CardBus with External ZV	PCI1221EVM
PCI1225: PCI Dual-Socket CardBus with External ZV	PCI1225EVM
PCI1250A: PCI Dual-Socket CardBus with Internal ZV	PCI1250AEVM
PCI2031: PCI Pwr Mngmnt Compliant, 32-Bit, PCI-PCI Bridge	PCI2031EVM
Power Management Products	
TL1454: 5-V to 3.3-V and 12-V Dual Output Buck and Boost Converters	TL1454EVM-085
TL5001: 5-V to 3.3-V, 3-A Buck Converter	TL5001EVM-087
TL5001: 5-V to 20-V/40-V Adjustable Boost Converter	TL5001EVM-088
TL5001: 9-V to 3.3-V, 3-A Synchronous Buck Converter	TL5001EVM-089
TL5001: 9-V to 3.3-V/5-V, 2.6-A Selectable Buck Converter	TL5001EVM-097
TL5001: 5-V to 3.3-V, 3-A Small-Profile Buck Converter	TL5001EVM-101

Resources & Contact Information

Title	Order No.
EVALUATION MODULES AND DEVELOPMENT TOOLS (Continued)	
Power Management Products (Continued)	
TL5001: 5-V to 2.5-V, 3-A Small-Profile Buck Converter . . .	TL5001EVM-102
TL5001: 5-V to 1.8-V, 3-A Small-Profile Buck Converter . . .	TL5001EVM-103
TPS5633: 5-V to 3.3-V, 8-A Small-Profile Sync Buck Converter . . .	TPS5633EVM-104
TPS5625: 5-V to 2.5-V, 8-A Small-Profile Sync Buck Converter . . .	TPS5625EVM-105
TPS5618: 5-V to 1.8-V, 8-A Small-Profile Sync Buck Converter . . .	TPS5618EVM-106
TPS5615: 5-V to 1.5-V, 8-A Small-Profile Sync Buck Converter . . .	TPS5615EVM-115
TPS6735: 5-V to -5-V, 200-mA Buck-Boost Converter (Inverter) . . .	TPS6735EVM
TL5001A: 5-V to 3.3-V, 3-A Buck Converter . . .	TL5001AEVM-108
TL5001A: 5-V to 2.5-V, 3-A Buck Converter . . .	TL5001AEVM-109
TL5001A: 5-V to 1.8-V, 3-A Buck Converter . . .	TL5001AEVM-110
TPS5210: TPS5210 UP Power Supply (VRM Rev. 8.3), Programmable Voltage, 19 A . . .	TPS5210EVM-116
TPS5210: TPS5210 Programmable Voltage, 20-A Evaluation Board . . .	TPS5210EVM-119
TPS5633: 5-V to 3.3-V, 6-A Surface Mount Sync Buck Converter . . .	TPS5633EVM-111
TPS5625: 5-V to 2.5-V, 6-A Surface Mount Sync Buck Converter . . .	TPS5625EVM-112
TPS5618: 5-V to 1.8-V, 6-A Surface Mount Sync Buck Converter . . .	TPS5618EVM-113
TPS5615: 5-V to 1.5-V, 6-A Surface Mount Sync Buck Converter . . .	TPS5615EVM-114
TPS76901: 1-V LDO Regulator . . .	TPS76901EVM127
TPS6734: 5-V to 12-V 200-mA Boost Converter . . .	TPS6734EVM
TPS56100: 5-V, 6-A Synchronous Buck Converter with Programmable Output . . .	TPS56100EVM128
TPS9104: Integrated Power Supply, Audio Power System . . .	TPS9104EVM

Title	Order No.
EVALUATION MODULES AND DEVELOPMENT TOOLS (Continued)	
1394 Designer Kits	
TSB12LV21 and 200 Mbps PHY — Feature-Rich Board with Zoom Video Signals on Header, Zoom Video Test Connectors, S-RAM, Serial EEPROM, Power Circuit, Room for Additional Circuitry, Windows 95 and Windows NT Drivers . . .	TSBKPCITST
TSB12C01A and 200 Mbps PHY — Peripheral Card with ISA (PC/104) Expansion I/F, RS-232 I/F, Voice-Band A/D Converter, with Sample Software . . .	TSBKPRPHRL
Three TSB12C01A LINK Layers, TSB14C01 Backplane PHY, 100 Mbps PHY and 200 Mbps PHY — Backplane Card with TMS320C52 Controller and Sample Software . . .	TSBKBACKPL
TSB12LV22 and TSB41LV03—1394a Compliant Host Adapter, Runs under Windows 98 . . .	TSBKOHCI403
TSB12LV21B and TSB41LV03—Board Shows Optional Isolation Build and Includes Software for Windows 95 . . .	TSBKPCI403

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Internet

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Product Information Centers

Americas

Phone +1(972) 644-5580
Fax +1(972) 480-7800
Email sc-infomaster@ti.com

Europe, Middle East, and Africa

Phone
Deutsch +49-(0) 8161 80 3311
English +44-(0) 1604 66 3399
Español +34-(0) 90 23 54 0 28
Français +33-(0) 1-30 70 11 64
Italiano +33-(0) 1-30 70 11 67
Fax +44-(0) 1604 66 33 34
Email epic@ti.com

Japan

Phone
International +81-3-3344-5311
Domestic 0120-81-0026
Fax
International +81-3-3344-5317
Domestic 0120-81-0036
Email pic-japan@ti.com

Asia

Phone	International	+886-2-23786800	
Domestic	<u>Local Access Code</u>	<u>TI Number</u>	
Australia	1-800-881-011	-800-800-1450	
China	10810	-800-800-1450	
Hong Kong	800-96-1111	-800-800-1450	
India	000-117	-800-800-1450	
Indonesia	001-801-10	-800-800-1450	
Korea	080-551-2804	-	
Malaysia	1-800-800-011	-800-800-1450	
New Zealand	000-911	-800-800-1450	
Philippines	105-11	-800-800-1450	
Singapore	800-0111-111	-800-800-1450	
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Fax	886-2-2378-6808		
Email	tiasia@ti.com		

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Служба 800-800-1420
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Факс +44 (0) 1 20 30 11 93
Служба +44 (0) 1 20 30 11 94
Служба +44 (0) 20 33 24 0 30
Служба +44 (0) 1604 88 33 24
Служба +44 (0) 800 800 1420

Global Mobile East and Africa

Служба 800-800-1420
Телефон +44 (0) 1204 88 33 24
Служба +44 (0) 1604 88 33 24

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Телефон +44 (0) 1204 88 33 24
Служба +44 (0) 1 20 30 11 93
Служба +44 (0) 1 20 30 11 94
Служба +44 (0) 20 33 24 0 30
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Device Number Ordering Guide

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Temperature Suffix Definitions	C-2
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Package Suffix Definitions	C-3

For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B. Refer to Appendix D for a device index that includes literature and package information by device.

Device Number Breakdown

Typical Device Number						
TLV 2442 A I D R						
Products	Prefix Options	Typical Device Number	Optional Suffix	Temperature Suffix Options	Package Suffix Options	Carrier Suffix Options
Amplifiers & Comparators	LF, LM, LP, LT, MC, NE, OP, RC, SE, THS, TL, TLC, TLE, TLV, TPA, UA	2442	A, B	C, I, M, Q, Y, Z	D, DB, DBV, DCA, DGK, DGN, DGQ, DGS, DW, DWP, FK, J, JG, N, NE, NS, P, PS, PW, PWP, U, W, Y	LE, R, T
Data Converters	ICL, TL, TLC, TLV, TMS	0820	A	C, I, E, M, Q	CN, D, DA, DB, DL, DW, DWB, FK, FN, FR, J, JB, N, NS, NW, P, PFB, PM, PT, PW	LE, R
Interface Products	AM, LT, MAX, SN, TL, TSB, TUSB, UA, UC	75LBC176	A, B	C, I, M	D, DB, DGG, DGK, DGN, DL, DW, FK, FN, GFN, HV, J, JG, N, NS, NT, P, PAG, PBK, PBM, PDV, PFB, PFP, PGF, PH, PM, PN, PS, PT, PW, PZ, VF, WN	LE, R
Power Management Products	LM, LT, MC, SG, TL, TLC, TLE, TLV, TPS, UA, UC	2202	A	C, I, M, Q, Y	D, DAP, DB, DBV, DCS, DF, DW, FK, J, JG, KC, KTE, KTG, KTP, LP, N, NS, P, PK, PS, PT, PW, PWP, U, Y	LE, R
Power Drivers	DS, L, SN, TPIC ULN	2101	A, B	n/a	D, DA, DB, DW, DWP, J, KTA, KTC, KTR, KTS, N, NE, P, PS	R
Clock Drivers & Timers	CDC, CDCF, CDCR, TLC, NE	2509, 555	A, B	n/a	D, DB, DBQ, DGG, DL, DW, FN, N, PAH, PW	n/a
Micro-controllers	MSP, PMS	430	S	I	DL, DW, FN, FZ, HFD, JL, PG, PJM, PM, SZ	n/a
RF Products	TRF	1015	A, B	n/a	DB, PFB, PK, PW, PWP	n/a

Temperature Suffix Definitions

Some temperature suffixes have alternative temperature ranges.

- C = 0 to 70°C (Commercial)
- I, E = -40 to 85°C (Industrial)
- M = -55 to 125°C (Military)
- Q = -40 to 125°C
- Y = 25°C
- Z = -40 to 150°C

Carrier Suffix Options

- LE = Available only Left-Ended Taped-and-Reeled
- R = Available Taped-and-Reeled
- T = Available Taped-and-Reeled (small quantity)

Package Suffix Definitions

Refer to Appendix D for package availability by device number.

D:	Small Outline Package (SOP)	KTP:	Plastic Flange-Mount Package (PFM)
DA:	Thin Shrink Small-Outline Package (TSSOP)	KTR:	Plastic Flange-Mount Package (PFM)
DAP:	PowerPAD™ Plastic Small-Outline Package	KTS:	Plastic Flange-Mount Package (PFM)
DB:	Shrink Small-Outline Package (SSOP)	LP:	Plastic Cylindrical Package (TO/SOT)
DBV:	Small-Outline Transistor (SOT-23)	MDN:	Metal Quad Flat Package (MQFP)
DCA:	PowerPAD Plastic Small-Outline Package (TSSOP)	MEP:	Metal Quad Flat Package (MQFP)
DF:	Shrink Small-Outline Package (SSOP)	N:	Plastic Dual-In-Line Package (PDIP)
DGG:	Plastic Thin Small-Outline Package (TSSOP)	NE:	Plastic Dual-In-Line Package (PDIP)
DGK:	Plastic Small-Outline Package (MSOP)	NS:	Plastic Small-Outline Package (SOP)
DGN:	PowerPAD Plastic Small-Outline Package (MSOP)	NT:	Plastic Dual-In-Line Package (PDIP)
DGQ:	PowerPAD Plastic Small-Outline Package (MSOP)	NW:	Plastic Dual-In-Line Package (PDIP)
DGS:	Plastic Small-Outline Package (MSOP)	P:	Plastic Dual-In-Line Package (PDIP)
DL:	Shrink Small-Outline Package (SSOP)	PAG:	Plastic Quad Flat Package (TQFP)
DW:	Small Outline Package (SOP)	PAH:	Plastic Quad Flat Package (TQFP)
DWB:	Plastic Small-Outline Package (SOP)	PBK:	Plastic Quad Flat Package (TQFP)
DWP:	PowerPAD Thermally Enhanced Small-Outline Package (HSOP)	PBM:	Plastic Quad Flat Package (QFP)
FK:	Leadless Ceramic Chip-Carrier Package (LCCC)	PCD:	Plastic Quad Flat Package (HQFP)
FN:	Plastic J-Leaded Chip-Carrier Package (PLCC)	PCE:	Plastic Quad Flat Package (HQFP)
FR:	Plastic Quad Flat Package (QFP)	PDV:	Plastic Quad Flat Package (TQFP)
FZ:	J-Leaded Ceramic Chip Carrier	PFB:	Plastic Quad Flat Package (TQFP)
GA:	Ceramic Pin Grid Array Package (CPGA)	PFP:	PowerPAD Plastic Quad Flat Package
GFN:	Plastic Ball Grid Array (BGA)	PG:	Plastic Quad Flat Package (QFP)
HFD:	Ceramic Quad Flatpack	PGF:	Plastic Quad Flat Package (TQFP)
HV:	Ceramic Quad Flat Package (CFP)	PH:	Plastic Quad Flat Package (QFP)
J:	Side-Braze Ceramic Package (CDIP-SB)	PJM:	Plastic Quad Flat Package (TQFP)
JG:	Ceramic Dual-In-Line Package (CDIP)	PK:	Plastic Thermally Enhanced Single-In-Line Package (HSIP)
JL:	Ceramic Dual-In-Line Package (CDIP)	PM:	Low Profile Quad Flat Package (LQFP)
JW:	Ceramic Dual-In-Line Package (CDIP)	PN:	Plastic Quad Flat Package (TQFP)
KC:	Cylindrical Package (TO/SOT)	PPA:	Thermally Enhanced Quad Flat Package (HQFP)
KTA:	Plastic Flange-Mount Package (PFM)	PS:	Small-Outline Package (SOP)
KTC:	Plastic Flange-Mount Package (PFM)	PT:	Plastic Thin Quad Flat Package (HLQFP)
KTE:	Plastic Flange-Mount Package (PFM)	PW:	Thin Shrink Small-Outline Package (TSSOP)
KTG:	Plastic Flange-Mount Package (PFM)	PWP:	Thermally Enhanced PowerPAD Package (HTSSOP)
		PZ:	Plastic Quad Flat Package (TQFP)
		U:	Ceramic Flat Package (CFP)
		VF:	Plastic Quad Flat Package (QFP)
		W:	Ceramic Flat Package (CFP)
		WN:	Ceramic Quad Flat Package (CFP)
		Y:	Unpackaged chip

TI Device Index for Analog & Mixed-Signal Products

For technical assistance, requesting datasheets or samples, see Contact Information in Appendix B.
For device number and package definitions, see Appendix C.

TI Device Index for Analog & Mixed-Signal Products

TI Device	Family	Section	Literature	Package
AM26C31	Interface Products	3	SLLS103G	D, DB, N
AM26C32	Interface Products	3	SLLS104F	D, DB, N
AM26LS31	Interface Products	3	SLLS114D	D, N, NS
AM26LS32A	Interface Products	3	SLLS115B	D, N, NS
AM26LS33A	Interface Products	3	SLLS115B	D, N
AM26LV31	Interface Products	3	SLLS201D	D, NS
AM26LV32	Interface Products	3	SLLS202C	D, NS
AM26S10	Interface Products	3	SLLS116C	D, N
CDC111	Clock Drivers & Timers	6	SCAS321F	FN
CDC203	Clock Drivers & Timers	6	SCAS324A	DW
CDC208	Clock Drivers & Timers	6	SCAS109F	DB, DW, N
CDC2351	Clock Drivers & Timers	6	SCAS442B	DB, DW
CDC2509	Clock Drivers & Timers	6	SCAS580A	PW
CDC2509A	Clock Drivers & Timers	6	SCAS603A	PW
CDC2509B	Clock Drivers & Timers	6	SCAS613	PW
CDC2509C†	Clock Drivers & Timers	6	SCAS620	PW
CDC2510	Clock Drivers & Timers	6	SCAS597	PW
CDC2510A	Clock Drivers & Timers	6	SCAS604A	PW
CDC2510B	Clock Drivers & Timers	6	SCAS612	PW
CDC2510C†	Clock Drivers & Timers	6	SCAS621	PW
CDC2516	Clock Drivers & Timers	6	SCAS579A	DGG
CDC2536	Clock Drivers & Timers	6	SCAS377D	DB, DL
CDC2582	Clock Drivers & Timers	6	SCAS379B	PAH
CDC2586	Clock Drivers & Timers	6	SCAS337C	PAH
CDC318A	Clock Drivers & Timers	6	SCAS614	DL
CDC319	Clock Drivers & Timers	6	SCAS590	DB
CDC328A	Clock Drivers & Timers	6	SCAS327B	D, DB
CDC329A	Clock Drivers & Timers	6	SCAS328B	D, DB
CDC337	Clock Drivers & Timers	6	SCAS330B	DB, DW
CDC339	Clock Drivers & Timers	6	SCAS331	DB, DW
CDC340	Clock Drivers & Timers	6	SCAS332B	DB, DW
CDC341	Clock Drivers & Timers	6	SCAS333D	DB, DW
CDC351	Clock Drivers & Timers	6	SCAS441C	DB, DW
CDC391	Clock Drivers & Timers	6	SCAS334A	D
CDC509	Clock Drivers & Timers	6	SCAS576B	PW
CDC516	Clock Drivers & Timers	6	SCAS575A	DGG
CDC536	Clock Drivers & Timers	6	SCAS378F	DB, DL
CDC582	Clock Drivers & Timers	6	SCAS446B	PAH
CDC586	Clock Drivers & Timers	6	SCAS336D	PAH
CDC921†	Clock Drivers & Timers	6	SCAS623	DL
CDC924†	Clock Drivers & Timers	6	SCAS607A	DL
CDC9841	Clock Drivers & Timers	6	SCAS458D	DW
CDC9842	Clock Drivers & Timers	6	SCAS546B	DW
CDC9843	Clock Drivers & Timers	6	SCAS559C	DW
CDCF2509†	Clock Drivers & Timers	6	SCAS624A	PW
CDCF2510†	Clock Drivers & Timers	6	SCAS628A	PW
CDCR81†	Clock Drivers & Timers	6	SCAS606A	DBQ

TI Device	Family	Section	Literature	Package
DS3680	Power Drivers	5	SLRS014C	D, N
GD75232	Interface Products	3	SLLS206C	DW, N
GD75323	Interface Products	3	SLLS213	DW, N
HPC3130	Interface Products	3	SCPU001	PBK, PBM
L293	Power Drivers	5	SLRS005	NE
L293D	Power Drivers	5	SLRS008A	NE
LF347	Amplifiers & Comparators	1	SLOS013B	D, N
LF353	Amplifiers & Comparators	1	SLOS012B	D, P
LF411	Amplifiers & Comparators	1	SLOS011C	D, P
LF412	Amplifiers & Comparators	1	SLOS010B	D, P
LM2902	Amplifiers & Comparators	1	SLOS066D	D, N, NS, PW
LM2904	Amplifiers & Comparators	1	SLOS068C	D, P, PW
LM306	Amplifiers & Comparators	1	SLCS008A	D, P
LM311	Amplifiers & Comparators	1	SLCS007A	D, P, PW, Y
LM318	Amplifiers & Comparators	1	SLOS063A	D, P
LM324	Amplifiers & Comparators	1	SLOS066D	D, N, NS, PW, Y
LM3302	Amplifiers & Comparators	1	SLCS014	D, N
LM336-2.5	Power Management Products	4	SLVS063A	D, LP
LM336B-2.5	Power Management Products	4	SLVS063A	D, LP
LM339	Amplifiers & Comparators	1	SLCS006C	D, DB, N, NS, PW, Y
LM339X2	Amplifiers & Comparators	1	SLCS122A	DB
LM348	Amplifiers & Comparators	1	SLOS058B	D, N
LM358	Amplifiers & Comparators	1	SLOS068C	D, P, PS, PW, Y
LM385-1.2	Power Management Products	4	SLVS075B	D, LP
LM385-2.5	Power Management Products	4	SLVS023D	D, LP
LM385B-1.2	Power Management Products	4	SLVS075B	D, LP
LM385B-2.5	Power Management Products	4	SLVS023D	D, LP
LM393	Amplifiers & Comparators	1	SLCS005D	D, P, PS, PW
LM393A	Amplifiers & Comparators	1	SLCS005D	D, P, PW
LP311	Amplifiers & Comparators	1	SLCS003A	D, P, PW
LP339	Amplifiers & Comparators	1	SLCS004A	D, N
LT1004-1.2	Power Management Products	4	SLVS022F	D, LP
LT1004-2.5	Power Management Products	4	SLVS022F	D, LP
LT1009	Power Management Products	4	SLVS013E	D, LP, PK, Y
LT1013	Amplifiers & Comparators	1	SLOS018B	P, Y
LT1030	Interface Products	3	SLLS048F	D, N
MAX232	Interface Products	3	SLLS047G	D, DW, N
MC1458	Amplifiers & Comparators	1	SLOS069	D, P
MC1488	Interface Products	3	SLLS094B	N
MC1489	Interface Products	3	SLLS095D	N
MC1489A	Interface Products	3	SLLS095D	N
MC3403	Amplifiers & Comparators	1	SLOS101	D, N, NS
MC3486	Interface Products	3	SLLS097B	D, J, N
MC3487	Interface Products	3	SLLS098A	D, J, N
MC79L05A	Power Management Products	4	SLVS011A	D, LP
MC79L12	Power Management Products	4	SLVS011A	D, LP
MC79L12A	Power Management Products	4	SLVS011A	D, LP

† Devices released since January 1999 Designer's Guide

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TI Device	Family	Section	Literature	Package
MC79L15	Power Management Products	4	SLVS011A	D, LP
MC79L15A	Power Management Products	4	SLVS011A	D, LP
MSP430C111	Microcontrollers	7	SLAS195	DW
MSP430C112	Microcontrollers	7	SLAS195	DW
MSP430C311S	Microcontrollers	7	SLAS165B	DL, SZ
MSP430C312	Microcontrollers	7	SLAS165B	DL
MSP430C313	Microcontrollers	7	SLAS165B	DL
MSP430C314	Microcontrollers	7	SLAS165B	DL
MSP430C315	Microcontrollers	7	SLAS165B	DL
MSP430C323	Microcontrollers	7	SLAS219	FN, PG, PM
MSP430C325	Microcontrollers	7	SLAS219	FN, PG, PM
MSP430C336	Microcontrollers	7	SLAS163	PJM
MSP430C337	Microcontrollers	7	SLAS163	PJM
MSP430P112	Microcontrollers	7	SLAS195	DW
MSP430P315	Microcontrollers	7	SLAS165B	DL
MSP430P315S	Microcontrollers	7	SLAS165B	SZ
MSP430P325	Microcontrollers	7	SLAS164	FN, PG, PM
MSP430P337	Microcontrollers	7	SLAS163	PJM
NE5532	Amplifiers & Comparators	1	SLOS075A	P
NE5534	Amplifiers & Comparators	1	SLOS070	D, P
OP07C	Amplifiers & Comparators	1	SLOS099B	D, P
OP07D	Amplifiers & Comparators	1	SLOS099B	D, P
PCI1210	Interface Products	3	XCPS024A	GGU, PGE
PCI1211	Interface Products	3	XCPS033A	GGU, PGE
PCI1220	Interface Products	3	XCPS016	PDV
PCI1221	Interface Products	3	SCPS042	PDV
PCI1225	Interface Products	3	SCPS035A	GHK, PDV
PCI1250A	Interface Products	3	XCPS014	GFN
PCI1251B	Interface Products	3	SCPS043A	GFN
PCI1410†	Interface Products	3	SCPS045	GGU, PGE
PCI1420†	Interface Products	3	SCPS047	GHK, PDV
PCI1450†	Interface Products	3	SCPS044	GFN, GJG
PCI2030	Interface Products	3	XCPS012	PGF
PCI2031	Interface Products	3	SCPS017A	PGF
PCI4450†	Interface Products	3	SCPS046	GFN, GJG
PCI930	Interface Products	3	SCPS018B	PBK
PCI950	Interface Products	3	SCPS015A	PT
PMS430E112	Microcontrollers	7	SLAS195	JL
PMS430E315	Microcontrollers	7	SLAS165B	FZ
PMS430E325	Microcontrollers	7	SLAS219	FZ
PMS430E337	Microcontrollers	7	SLAS163	HFD
RC4136	Amplifiers & Comparators	1	SLOS072	D, N
RC4558	Amplifiers & Comparators	1	SLOS073	D, P, PS, PW, Y
SG3524	Power Management Products	4	SLVS077A	D, J, N
SN65LVDM050†	Interface Products	3	SLLS324A	D
SN65LVDM051†	Interface Products	3	SLLS324A	D
SN65LVDM176†	Interface Products	3	SLLS320A	D, DGK

† Devices released since January 1999 Designer's Guide

TI Device	Family	Section	Literature	Package
SN65LVDM179†	Interface Products	3	SLLS324A	D, DGK
SN65LVDM180†	Interface Products	3	SLLS324A	D
SN65LVDM22†	Interface Products	3	SLLS315	D
SN65LVDS050	Interface Products	3	SLLS301C	D
SN65LVDS051	Interface Products	3	SLLS301C	D
SN65LVDS1050†	Interface Products	3	SLLS343	PW
SN65LVDS179	Interface Products	3	SLLS301C	D, DGK
SN65LVDS180	Interface Products	3	SLLS301C	D
SN65LVDS22†	Interface Products	3	SLLS315	D
SN65LVDS31	Interface Products	3	SLLS261C	D
SN65LVDS32	Interface Products	3	SLLS262D	D
SN65LVDS3486	Interface Products	3	SLLS262D	D
SN65LVDS3487	Interface Products	3	SLLS261C	D
SN65LVDS93	Interface Products	3	SLLS302A	DGG
SN65LVDS94	Interface Products	3	SLLS298A	DGG
SN65LVDS95	Interface Products	3	SLLS297A	DGG
SN65LVDS96	Interface Products	3	SLLS296A	DGG
SN65LVDS9637	Interface Products	3	SLLS262D	D, DGN
SN65LVDS9638	Interface Products	3	SLLS261C	D, DGN
SN75107A	Interface Products	3	SLLS069D	D, N
SN75107B	Interface Products	3	SLLS069D	D, N
SN75108A	Interface Products	3	SLLS069D	D, N
SN75110A	Interface Products	3	SLLS106D	D, J, N
SN75112	Interface Products	3	SLLS106D	D, N
SN75113	Interface Products	3	SLLS070C	D, N
SN75114	Interface Products	3	SLLS071C	D, J, N
SN75115	Interface Products	3	SLLS072D	D, N
SN75116	Interface Products	3	SLLS073D	D, N
SN75117	Interface Products	3	SLLS073D	D, P
SN751177	Interface Products	3	SLLS059C	N, NS
SN751178	Interface Products	3	SLLS059C	N, NS
SN75118	Interface Products	3	SLLS073D	D, N
SN75119	Interface Products	3	SLLS073D	D, P
SN75123	Interface Products	3	SLLS086C	D, N
SN75124	Interface Products	3	SLLS058B	D, N
SN75138	Interface Products	3	SLLS079B	D, N
SN75140	Interface Products	3	SLLS080C	D, JG, P
SN75146	Interface Products	3	SLLS015B	D, P
SN75150	Interface Products	3	SLLS081B	D, JG, P
SN75154	Interface Products	3	SLLS083B	D, N
SN75155	Interface Products	3	SLLS017C	D, JG, P
SN75157	Interface Products	3	SLLS084C	D, P, PS
SN75158	Interface Products	3	SLLS085B	D, P, PS
SN75159	Interface Products	3	SLLS088B	D, N
SN75160B	Interface Products	3	SLLS004B	DW, N
SN75161B	Interface Products	3	SLLS005B	DW, N
SN75162B	Interface Products	3	SLLS005B	DW, N

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TI Device	Family	Section	Literature	Package
SN75172	Interface Products	3	SLLS038B	DW, N
SN75173	Interface Products	3	SLLS144D	D, J, N
SN751730	Interface Products	3	SLLS062C	D, N, NS
SN75174	Interface Products	3	SLLS039B	DW, J, N
SN75175	Interface Products	3	SLLS145B	D, J, N
SN75176A	Interface Products	3	SLLS100A	D, P
SN75176B	Interface Products	3	SLLS101A	D, P
SN75179B	Interface Products	3	SLLS003E	D, P, PS
SN75182	Interface Products	3	SLLS092D	D, N
SN75183	Interface Products	3	SLLS093D	D, N
SN75185	Interface Products	3	SLLS181	DW, N
SN75188	Interface Products	3	SLLS094B	D, N, NS
SN75189	Interface Products	3	SLLS095D	D, N, NS
SN75189A	Interface Products	3	SLLS095D	D, N, NS
SN75196	Interface Products	3	SLLS188B	DW, N
SN75207B	Interface Products	3	SLLS096C	D, N
SN75372	Power Drivers	5	SLLS025A	D, P
SN75374	Power Drivers	5	SLRS028	D, N
SN75437A	Power Drivers	5	SLRS019A	NE
SN754410	Power Drivers	5	SLRS007B	NE
SN75451B	Power Drivers	5	SLRS021A	D, P
SN75452B	Power Drivers	5	SLRS021A	D, P, PS
SN75453B	Power Drivers	5	SLRS021A	D, P
SN75454B	Power Drivers	5	SLRS021A	D, P
SN75462	Power Drivers	5	SLRS022A	D, P
SN75463	Power Drivers	5	SLRS022A	D, P
SN75468	Power Drivers	5	SLRS023B	D, N
SN75469	Power Drivers	5	SLRS023B	D, N
SN75471	Power Drivers	5	SLRS024	D, P
SN75472	Power Drivers	5	SLRS024	D, P
SN75477	Power Drivers	5	SLRS025A	D, P
SN75478	Power Drivers	5	SLRS025A	D, P
SN75976A	Interface Products	3	SLLS218B	DGG, DL
SN75ALS056	Interface Products	3	SLLS028G	DW, N
SN75ALS057	Interface Products	3	SLLS028G	DW, N
SN75ALS085	Interface Products	3	SLLS054B	DW, NT
SN75ALS1177	Interface Products	3	SLLS154A	N, NS
SN75ALS1178	Interface Products	3	SLLS154A	N, NS
SN75ALS160	Interface Products	3	SLLS018D	DW, N
SN75ALS161	Interface Products	3	SLLS019D	DW, N
SN75ALS162	Interface Products	3	SLLS020C	DW, N
SN75ALS170	Interface Products	3	SLLS055D	DW, J
SN75ALS170A	Interface Products	3	SLLS055D	DW
SN75ALS171	Interface Products	3	SLLS056D	DW, J
SN75ALS171A	Interface Products	3	SLLS056D	DW
SN75ALS172A	Interface Products	3	SLLS121D	DW, N
SN75ALS173	Interface Products	3	SLLS132C	N, NS

TI Device	Family	Section	Literature	Package
SN75ALS174A	Interface Products	3	SLLS122E	DW, N
SN75ALS175	Interface Products	3	SLLS131C	N, NS
SN75ALS176	Interface Products	3	SLLS040E	D, P
SN75ALS176A	Interface Products	3	SLLS040E	D, P
SN75ALS176B	Interface Products	3	SLLS040E	D, P
SN75ALS180	Interface Products	3	SLLS052E	D, N
SN75ALS191	Interface Products	3	SLLS032B	D, P
SN75ALS192	Interface Products	3	SLLS007D	D, N
SN75ALS193	Interface Products	3	SLLS008D	D, J, N
SN75ALS194	Interface Products	3	SLLS009D	D, N
SN75ALS195	Interface Products	3	SLLS010D	J, N
SN75ALS197	Interface Products	3	SLLS045B	D, J, N
SN75ALS199	Interface Products	3	SLLS046C	D, N
SN75C1154	Interface Products	3	SLLS151C	DW, N
SN75C1167	Interface Products	3	SLLS159C	N, NS
SN75C1168	Interface Products	3	SLLS159C	N, NS
SN75C1406	Interface Products	3	SLLS148C	D, DW, N
SN75C185	Interface Products	3	SLLS065D	DW, N
SN75C188	Interface Products	3	SLLS033F	D, DB, N
SN75C189	Interface Products	3	SLLS041E	D, N
SN75C189A	Interface Products	3	SLLS041E	D, DB, N
SN75LBC172	Interface Products	3	SLLS163	DW, N
SN75LBC173	Interface Products	3	SLLS170A	D, N
SN75LBC174	Interface Products	3	SLLS162	DW, N
SN75LBC175	Interface Products	3	SLLS171	D, N
SN75LBC176	Interface Products	3	SLLS067D	D, P
SN75LBC179	Interface Products	3	SLLS173B	D, P
SN75LBC180	Interface Products	3	SLLS174A	D, N
SN75LBC184	Interface Products	3	SLLS236A	D, P
SN75LBC187	Interface Products	3	SLLS130C	DB
SN75LBC241	Interface Products	3	SLLS137D	DW
SN75LBC771	Interface Products	3	SLLS226A	DW, NS
SN75LBC773	Interface Products	3	SLLS247C	DW
SN75LBC775	Interface Products	3	SLLS216A	DW
SN75LBC776	Interface Products	3	SLLS221A	DW
SN75LBC777	Interface Products	3	SLLS227	DW
SN75LBC784	Interface Products	3	SLLS187A	DW
SN75LBC786	Interface Products	3	SLLS184	DW
SN75LBC968	Interface Products	3	SLLS179B	DL
SN75LBC970A	Interface Products	3	SLLS215A	DL
SN75LBC971A	Interface Products	3	SLLS186B	DL
SN75LBC978	Interface Products	3	SLLS134E	DL
SN75LP1185†	Interface Products	3	SLLS335	DB, DW, N, PW
SN75LPE185	Interface Products	3	SLLS256D	DB, DW, NT, PW
SN75LV4737A	Interface Products	3	SLLS178A	DB
SN75LVDM976	Interface Products	3	SLLS292	DGG, DL
SN75LVDM977†	Interface Products	3	SLLS292A	DG, DGG

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TI Device	Family	Section	Literature	Package
SN75LVDS81	Interface Products	3	SLLS258A	DGG
SN75LVDS82	Interface Products	3	SLLS259C	DGG
SN75LVDS83	Interface Products	3	SLLS271	DGG
SN75LVDS84	Interface Products	3	SLLS270A	DGG
SN75LVDS85	Interface Products	3	SLLS270A	DGG
SN75LVDS86	Interface Products	3	SLLS268B	DGG
SN75LVDS86A†	Interface Products	3	SLLS318A	DGG
SN95176B	Interface Products	3	SGLS026A	FK, JG
TCM29C13	Data Converters	2	SCTS011H	DW, N
TCM29C13A	Data Converters	2	SCTS030E	DW, N
TCM29C14	Data Converters	2	SCTS011H	DW
TCM29C14A	Data Converters	2	SCTS030E	DW
TCM29C16	Data Converters	2	SCTS011H	DW, N
TCM29C16A	Data Converters	2	SCTS030E	DW, N
TCM29C17	Data Converters	2	SCTS011H	DW, N
TCM29C17A	Data Converters	2	SCTS030E	DW, N
TCM29C18	Data Converters	2	SCTS021D	DW, N
TCM29C19	Data Converters	2	SCTS021D	DW, N
TCM29C23	Data Converters	2	SCTS029A	DW, N
TCM320AC36	Data Converters	2	SLWS003C	DW, N, PT
TCM320AC37	Data Converters	2	SLWS003C	DW, N
TCM320AC39	Data Converters	2	SLWS004B	DW, N, PT
TCM320AC54	Data Converters	2	SCTS043A	DW, N
TCM320AC56	Data Converters	2	SLWS016A	DW
TCM37C14	Data Converters	2	SLWA006	DW
TCM37C15	Data Converters	2	SLWA006	DW, N
TCM38C17	Data Converters	2	SLWS040A	DL
THS1206†	Data Converters	2	SLAS217	DA
THS3001	Amplifiers & Comparators	1	SLOS217	D
THS4001	Amplifiers & Comparators	1	SLOS206	D
THS4031†	Amplifiers & Comparators	1	SLOS224	D, DGN
THS4032†	Amplifiers & Comparators	1	SLOS224	D, DGN
THS4061†	Amplifiers & Comparators	1	SLOS234B	D, DGN
THS4062†	Amplifiers & Comparators	1	SLOS234B	D, DGN
THS5641†	Data Converters	2	SLAS199	DW, PW
THS5651†	Data Converters	2	SLAS197	DW, PW
THS5661†	Data Converters	2	SLAS200	DW, PW
THS6002	Amplifiers & Comparators	1	SLOS202C	DWP
THS6012	Amplifiers & Comparators	1	SLOS226A	DWP
THS6022†	Amplifiers & Comparators	1	SLOS225B	PWP
THS6062†	Amplifiers & Comparators	1	SLOS228B	D, DGN
THS7002†	Amplifiers & Comparators	1	SLOS214A	PWP
THS8133†	Data Converters	2	SLVS204	PHP
THS8134†	Data Converters	2	SLVS205	PHP
TIL300	Power Management Products	4	SOES019A	DCS, N
TIL300A	Power Management Products	4	SOES019A	DCS, N
TIR1000	Interface Products	3	SLLS228E	PS, PW

TI Device	Family	Section	Literature	Package
TIR2000	Interface Products	3	SLLS248A	PAG
TL022	Amplifiers & Comparators	1	SLOS076	D, P
TL031	Amplifiers & Comparators	1	SLOS180A	D, P, PW
TL032	Amplifiers & Comparators	1	SLOS180A	D, P, PW
TL034	Amplifiers & Comparators	1	SLOS180A	D, N, PW
TL051	Amplifiers & Comparators	1	SLOS178	D, P
TL052	Amplifiers & Comparators	1	SLOS178	D, P
TL054	Amplifiers & Comparators	1	SLOS178	D, N
TL061	Amplifiers & Comparators	1	SLOS078E	D, P, PW
TL062	Amplifiers & Comparators	1	SLOS078E	D, JG, P, PS, PW
TL064	Amplifiers & Comparators	1	SLOS078E	D, N, NS, PW
TL070	Amplifiers & Comparators	1	SLOS121A	D, P
TL071	Amplifiers & Comparators	1	SLOS080D	D, JG, P, PS, PW
TL072	Amplifiers & Comparators	1	SLOS080D	D, P, PS
TL074	Amplifiers & Comparators	1	SLOS080D	D, J, N, PW
TL081	Amplifiers & Comparators	1	SLOS081D	D, P, PW
TL082	Amplifiers & Comparators	1	SLOS081D	D, JG, P, PS, PW
TL084	Amplifiers & Comparators	1	SLOS081D	D, J, N, NS, PW
TL1431	Power Management Products	4	SLVS062C	D, LP
TL1451A	Power Management Products	4	SLVS024C	DB, N, NS, PW
TL1454	Power Management Products	4	SLVS086B	D, N, PW
TL145406	Interface Products	3	SLLS185A	DW, N
TL16C450	Interface Products	3	SLLS037B	FN, N
TL16C451	Interface Products	3	SLLS053B	FN
TL16C452	Interface Products	3	SLLS053B	FN
TL16C550C	Interface Products	3	SLLS177E	FN, N, PFB, PT
TL16C552A	Interface Products	3	SLLS189C	FN, HV, PN
TL16C554	Interface Products	3	SLLS165D	FN
TL16C750	Interface Products	3	SLLS191C	FN, PM
TL16C752†	Interface Products	3	SLLS305	PT
TL16C754	Interface Products	3	SLLS279	FN, PN
TL16PC564B	Interface Products	3	SLLS225A	PZ
TL16PIR552	Interface Products	3	SLLS222A	PH
TL2217-285	Power Management Products	4	SLVS066E	KC, PW
TL2218-285	Power Management Products	4	SLVS072C	PW
TL3016	Amplifiers & Comparators	1	SLCS130B	D, PW
TL3116	Amplifiers & Comparators	1	SLCS132B	D, PW
TL317	Power Management Products	4	SLVS004B	D, LP
TL343†	Amplifiers & Comparators	1	SLOS250B	DBV
TL3472†	Amplifiers & Comparators	1	SLOS200A	D, P
TL3695	Interface Products	3	SLLS044C	D, P
TL393	Amplifiers & Comparators	1	SLCS120A	D, P, PW
TL430	Power Management Products	4	SLVS050A	LP
TL431	Power Management Products	4	SLVS005I	D, LP, P, PK, PS, PW
TL431A	Power Management Products	4	SLVS005I	D, LP, P
TL494	Power Management Products	4	SLVS074A	D, J, N, NS, PW
TL497A	Power Management Products	4	SLVS009C	D, J, N, NS

† Devices released since January 1999 Designer's Guide

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TI Device	Family	Section	Literature	Package
TL499A	Power Management Products	4	SLVS029B	P, PS
TL5001	Power Management Products	4	SLVS084D	O, D, P, PS
TL5501	Data Converters	2	SLAS026	CN
TL5632	Data Converters	2	SLAS091	FR
TL594	Power Management Products	4	SLVS052B	D, N
TL598	Power Management Products	4	SLVS053B	D, FK, J, N
TL712	Amplifiers & Comparators	1	SLCS002B	D, P, PS
TL714	Amplifiers & Comparators	1	SLCS015	D, P
TL750L05	Power Management Products	4	SLVS017G	D, KC, LP, P
TL750L08	Power Management Products	4	SLVS017G	D, KC, LP, P
TL750L10	Power Management Products	4	SLVS017G	D, KC, LP, P
TL750L12	Power Management Products	4	SLVS017G	D, KC, LP, P
TL750M05	Power Management Products	4	SLVS021F	KC, KTE
TL750M08	Power Management Products	4	SLVS021F	KC, KTE
TL750M10	Power Management Products	4	SLVS021F	KC, KTE
TL750M12	Power Management Products	4	SLVS021F	KC, KTE
TL751L05	Power Management Products	4	SLVS017G	D, P
TL751L08	Power Management Products	4	SLVS017G	D, P
TL751L10	Power Management Products	4	SLVS017G	D, P
TL751L12	Power Management Products	4	SLVS017G	D, P
TL751M05	Power Management Products	4	SLVS021F	KC, KTG
TL751M08	Power Management Products	4	SLVS021F	KC, KTG
TL751M10	Power Management Products	4	SLVS021F	KC, KTG
TL751M12	Power Management Products	4	SLVS021F	KC, KTG
TL75LP05	Power Management Products	4	SLVS073A	PW
TL75LP08	Power Management Products	4	SLVS073A	PW
TL75LP10	Power Management Products	4	SLVS073A	PW
TL75LP12	Power Management Products	4	SLVS073A	PW
TL75LP48	Power Management Products	4	SLVS073A	PW
TL7702A	Power Management Products	4	SLVS028C	D, P
TL7702B	Power Management Products	4	SLVS037G	D, P
TL7705A	Power Management Products	4	SLVS028C	D, P, PS
TL7705B	Power Management Products	4	SLVS037G	D, P
TL7709A	Power Management Products	4	SLVS028C	D, P
TL7712A	Power Management Products	4	SLVS028C	D, P
TL7715A	Power Management Products	4	SLVS028C	D, P
TL7757	Power Management Products	4	SLVS041D	D, LP, PK
TL7759	Power Management Products	4	SLVS042C	D, P, PW
TL7770-15	Power Management Products	4	SLVS019D	DW, N
TL7770-5	Power Management Products	4	SLVS019D	DW, N
TL780-05	Power Management Products	4	SLVS055D	KC, KTE
TL780-12	Power Management Products	4	SLVS055D	KC, KTE
TL780-15	Power Management Products	4	SLVS055D	KC, KTE
TL783	Power Management Products	4	SLVS036C	KC
TLC0820A	Data Converters	2	SLAS064A	DB, DW, FN, N
TLC0831	Data Converters	2	SLAS107B	D, P
TLC0832	Data Converters	2	SLAS107B	D, P

TI Device	Family	Section	Literature	Package
TLC0834	Data Converters	2	SLAS094C	D, N
TLC0838	Data Converters	2	SLAS094C	DW, N
TLC1078	Amplifiers & Comparators	1	SLOS179	D, P
TLC1079	Amplifiers & Comparators	1	SLOS179	D, N
TLC1541	Data Converters	2	SLAS073C	DW, FN, N
TLC1542	Data Converters	2	SLAS052E	DW, FN, J, N
TLC1543	Data Converters	2	SLAS052E	DB, DW, FN, N
TLC1549	Data Converters	2	SLAS059C	D, P
TLC1550	Data Converters	2	SLAS043C	FK, FN, J, NW
TLC1551	Data Converters	2	SLAS043C	FN
TLC2201	Amplifiers & Comparators	1	SLOS175	D, P
TLC2202	Amplifiers & Comparators	1	SLOS175	D, JG, P
TLC2252	Amplifiers & Comparators	1	SLOS176	D, FK, JG, P, PW, U
TLC2254	Amplifiers & Comparators	1	SLOS176	D, FK, J, N, PW, W
TLC2262	Amplifiers & Comparators	1	SLOS177	D, P, PW
TLC2264	Amplifiers & Comparators	1	SLOS177	D, N, PW
TLC2272	Amplifiers & Comparators	1	SLOS190	D, P, PW
TLC2274	Amplifiers & Comparators	1	SLOS190	D, N, PW
TLC251	Amplifiers & Comparators	1	SLOS001E	D, P
TLC252	Amplifiers & Comparators	1	SLOS002G	D, P
TLC254	Amplifiers & Comparators	1	SLOS003F	D, N
TLC2543	Data Converters	2	SLAS079D	DB, DW, FN, J, N
TLC2554†	Data Converters	2	SLAS220	D, PW
TLC2558†	Data Converters	2	SLAS220	DW, PW
TLC25L2	Amplifiers & Comparators	1	SLOS002G	D, P
TLC25L4	Amplifiers & Comparators	1	SLOS003F	D, N
TLC25M2	Amplifiers & Comparators	1	SLOS002G	D, P, PW
TLC25M4	Amplifiers & Comparators	1	SLOS003F	D, N
TLC2652	Amplifiers & Comparators	1	SLOS019B	D, N, P
TLC2654	Amplifiers & Comparators	1	SLOS020D	D, N, P
TLC271	Amplifiers & Comparators	1	SLOS090C	D, P, PW
TLC272	Amplifiers & Comparators	1	SLOS091B	D, P, PS, PW
TLC274	Amplifiers & Comparators	1	SLOS092B	D, N, NS, PW
TLC277	Amplifiers & Comparators	1	SLOS091B	D, P, PS
TLC279	Amplifiers & Comparators	1	SLOS092B	D, FK, J, N
TLC27L1	Amplifiers & Comparators	1	SLOS154	D
TLC27L2	Amplifiers & Comparators	1	SLOS052B	D, P, PS, PW
TLC27L4	Amplifiers & Comparators	1	SLOS053C	D, N, NS, PW
TLC27L7	Amplifiers & Comparators	1	SLOS052B	D, P
TLC27L9	Amplifiers & Comparators	1	SLOS053C	D, N
TLC27M2	Amplifiers & Comparators	1	SLOS051B	D, P, PS, PW
TLC27M4	Amplifiers & Comparators	1	SLOS093B	D, N, PW
TLC27M7	Amplifiers & Comparators	1	SLOS051B	D, P
TLC27M9	Amplifiers & Comparators	1	SLOS093B	D, N, NS
TLC2932	Data Converters	2	SLAS097E	PW
TLC2933	Data Converters	2	SLAS136A	PW
TLC2942	Data Converters	2	SLAS146B	DB

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TI Device	Family	Section	Literature	Package
TLC32040	Data Converters	2	SLAS014E	FN, N
TLC32044	Data Converters	2	SLAS017F	FK, FN, J, JB, N
TLC32045	Data Converters	2	SLAS017F	FN
TLC32046	Data Converters	2	SLAS028B	FK, FN, J, JB, N
TLC32047	Data Converters	2	SLAS049A	FN, N
TLC320AC01	Data Converters	2	SLAS057D	DW, FN, PM
TLC320AC02	Data Converters	2	SLAS084C	FN, PM
TLC320AD50	Data Converters	2	SLAS131B	DW, PT
TLC320AD52	Data Converters	2	SLAS131B	DW, PT
TLC320AD535	Data Converters	2	SLAS202	PM
TLC320AD545	Data Converters	2	SLAS206	PT
TLC320AD56	Data Converters	2	SLAS101A	FN, PT
TLC320AD57	Data Converters	2	SLAS086A	DW
TLC320AD58	Data Converters	2	SLAS102	DW
TLC320AD75	Data Converters	2	SLAS144	DL
TLC320AD80	Data Converters	2	SLAS141	PM
TLC320AD81‡	Data Converters	2	SLAS203	DBT
TLC320AD90	Data Converters	2	SLAS173	FN, PM
TLC320AD91	Data Converters	2	SLAS185	PT
TLC339	Amplifiers & Comparators	1	SLCS119	D, N, PW
TLC352	Amplifiers & Comparators	1	SLCS016	D, P
TLC354	Amplifiers & Comparators	1	SLCS116B	D, N
TLC3702	Amplifiers & Comparators	1	SLCS013D	D, P, PS, PW
TLC3704	Amplifiers & Comparators	1	SLCS117A	D, N, NS, PW
TLC372	Amplifiers & Comparators	1	SLCS114A	D, P, PW
TLC374	Amplifiers & Comparators	1	SLCS118A	D, N, PW
TLC393	Amplifiers & Comparators	1	SLCS115C	D, P, PW
TLC4501	Amplifiers & Comparators	1	SLOS221	D
TLC4502	Amplifiers & Comparators	1	SLOS221	D
TLC540	Data Converters	2	SLAS065A	DW, FN, N
TLC541	Data Converters	2	SLAS065A	DW, FN, N
TLC542	Data Converters	2	SLAS075A	DW, FN, N
TLC545	Data Converters	2	SLAS066B	FN, N
TLC546	Data Converters	2	SLAS066B	FN, N
TLC548	Data Converters	2	SLAS067C	D, P
TLC549	Data Converters	2	SLAS067C	D, P
TLC5510	Data Converters	2	SLAS095I	BOARD, NS
TLC5510A	Data Converters	2	SLAS095I	NS
TLC5540	Data Converters	2	SLAS105B	BOARD, NS
TLC5602	Data Converters	2	SLAS023C	DW, J, N
TLC5615	Data Converters	2	SLAS142B	D, P
TLC5617A	Data Converters	2	SLAS151B	D
TLC5618A	Data Converters	2	SLAS156C	D
TLC5620	Data Converters	2	SLAS081C	D, N
TLC5628	Data Converters	2	SLAS089E	DW, N
TLC5733A	Data Converters	2	SLAS104A	PM
TLC7135	Data Converters	2	SLAS074A	N

TI Device	Family	Section	Literature	Package
TLC7225	Data Converters	2	SLAS109	DW
TLC7226	Data Converters	2	SLAS060B	DW, N
TLC7524	Data Converters	2	SLAS061B	D, FN, N, PW
TLC7528	Data Converters	2	SLAS062A	DW, FN, N
TLC7628	Data Converters	2	SLAS063A	DW, N
TLC7701	Power Management Products	4	SLVS087I	D, PW
TLC7703	Power Management Products	4	SLVS087I	D, PW
TLC7705	Power Management Products	4	SLVS087I	D, FK, JG, P, PW
TLC7725	Power Management Products	4	SLVS087I	D, P, PW
TLC7733	Power Management Products	4	SLVS087I	D, FK, JG, P, PW
TLC8188	Data Converters	2	SLAS177A	DA
TLC876	Data Converters	2	SLAS140B	BOARD, DB, DW, PW
TLC976‡	Data Converters	2	SLAS193	DGG
TLE2021	Amplifiers & Comparators	1	SLOS191	D, P, PW
TLE2022	Amplifiers & Comparators	1	SLOS191	D, P
TLE2024	Amplifiers & Comparators	1	SLOS191	DW, N
TLE2027	Amplifiers & Comparators	1	SLOS192	D, P
TLE2037	Amplifiers & Comparators	1	SLOS192	D, P
TLE2061	Amplifiers & Comparators	1	SLOS193A	D, P
TLE2062	Amplifiers & Comparators	1	SLOS193A	D, P
TLE2064	Amplifiers & Comparators	1	SLOS193A	D, N
TLE2071	Amplifiers & Comparators	1	SLOS181	D, P
TLE2072	Amplifiers & Comparators	1	SLOS181	D, P
TLE2074	Amplifiers & Comparators	1	SLOS181	DW, N
TLE2081	Amplifiers & Comparators	1	SLOS182	D, P
TLE2082	Amplifiers & Comparators	1	SLOS182	D, P
TLE2084	Amplifiers & Comparators	1	SLOS182	DW, N
TLE2141	Amplifiers & Comparators	1	SLOS183	D, P
TLE2142	Amplifiers & Comparators	1	SLOS183	D, P, PW, Y
TLE2144	Amplifiers & Comparators	1	SLOS183	DW, N
TLE2161	Amplifiers & Comparators	1	SLOS049D	D, P
TLE2227	Amplifiers & Comparators	1	SLOS184	DW, P
TLE2237	Amplifiers & Comparators	1	SLOS184	DW, P
TL-SCSI285	Power Management Products	4	SLVS065E	FK, J, KC, PW
TLV0831	Data Converters	2	SLAS148	D, P
TLV0832	Data Converters	2	SLAS148	D, P
TLV0834	Data Converters	2	SLAS147	D, N
TLV0838	Data Converters	2	SLAS147	DW, N
TLV1391	Amplifiers & Comparators	1	SLCS128A	DBV
TLV1393	Amplifiers & Comparators	1	SLCS121A	D, P, PW
TLV1543	Data Converters	2	SLAS072C	DB, DW, FN, N
TLV1544	Data Converters	2	SLAS139B	BOARD, D, PW
TLV1548	Data Converters	2	SLAS139B	DB, DW, FK, J, N
TLV1549	Data Converters	2	SLAS071C	D, P
TLV1562	Data Converters	2	SLAS162	DW, PW
TLV1570	Data Converters	2	SLAS169A	DW, PW
TLV1571‡	Data Converters	2	SLAS170	DW, PW

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TI Device	Family	Section	Literature	Package
TLV1572	Data Converters	2	SLAS171A	BOARD, D
TLV1578†	Data Converters	2	SLAS170	DA
TLV2211	Amplifiers & Comparators	1	SLOS156B	DBV
TLV2217-33	Power Management Products	4	SLVS067F	KC, KTP, PW
TLV2221	Amplifiers & Comparators	1	SLOS157A	DBV
TLV2231	Amplifiers & Comparators	1	SLOS158C	DBV
TLV2252	Amplifiers & Comparators	1	SLOS185	D, FK, JG, P
TLV2254	Amplifiers & Comparators	1	SLOS185	D, FK, J, N, W
TLV2262	Amplifiers & Comparators	1	SLOS186	D, P
TLV2264	Amplifiers & Comparators	1	SLOS186	D, FK, J, N, W
TLV2322	Amplifiers & Comparators	1	SLOS187	D, P, PW
TLV2324	Amplifiers & Comparators	1	SLOS187	D, N, PW
TLV2332	Amplifiers & Comparators	1	SLOS189	D, P, PW
TLV2334	Amplifiers & Comparators	1	SLOS189	D, N, PW
TLV2341	Amplifiers & Comparators	1	SLOS110A	D, P, PW
TLV2342	Amplifiers & Comparators	1	SLOS194	D, P, PW
TLV2344	Amplifiers & Comparators	1	SLOS194	D, N, PW
TLV2352	Amplifiers & Comparators	1	SLCS011A	D, P, PW
TLV2354	Amplifiers & Comparators	1	SLCS012A	D, N, PW
TLV2361	Amplifiers & Comparators	1	SLOS195B	DBV
TLV2362	Amplifiers & Comparators	1	SLOS195B	D, P, PW
TLV2393	Amplifiers & Comparators	1	SLCS121A	D, P, PW
TLV2422	Amplifiers & Comparators	1	SLOS199A	D, FK, JG, PW, U
TLV2432	Amplifiers & Comparators	1	SLOS168B	D, FK, JG, PW, U
TLV2442	Amplifiers & Comparators	1	SLOS169D	D, FK, JG, PW, U
TLV2450†	Amplifiers & Comparators	1	SLOS218A	D,P
TLV2451†	Amplifiers & Comparators	1	SLOS218A	D,P
TLV2454†	Amplifiers & Comparators	1	SLOS218A	D,N,PW
TLV2455†	Amplifiers & Comparators	1	SLOS218A	D,N,PW
TLV2460	Amplifiers & Comparators	1	SLOS220B	D, P, DBV
TLV2461	Amplifiers & Comparators	1	SLOS220B	D, P, DBV
TLV2462	Amplifiers & Comparators	1	SLOS220B	D, P, DGK
TLV2463	Amplifiers & Comparators	1	SLOS220B	D, N, P, DGS
TLV2464	Amplifiers & Comparators	1	SLOS220B	D, N, PW
TLV2465	Amplifiers & Comparators	1	SLOS220B	D, N, PW
TLV2543	Data Converters	2	SLAS096B	DB, DW, N
TLV2544†	Data Converters	2	SLAS198	D,PW
TLV2548†	Data Converters	2	SLAS198	DW,PW
TLV2711	Amplifiers & Comparators	1	SLOS196	DBV
TLV2721	Amplifiers & Comparators	1	SLOS197	DBV
TLV2731	Amplifiers & Comparators	1	SLOS198	DBV
TLV2770†	Amplifiers & Comparators	1	SLOS209C	D,DGK,P
TLV2771	Amplifiers & Comparators	1	SLOS209A	D, DBV, P
TLV2772	Amplifiers & Comparators	1	SLOS209A	D, P, DGK
TLV2773†	Amplifiers & Comparators	1	SLOS209C	D,DGS,N
TLV2774†	Amplifiers & Comparators	1	SLOS209C	D,P,PW
TLV2775†	Amplifiers & Comparators	1	SLOS209C	D,N,PW

TI Device	Family	Section	Literature	Package
TLV320AC36	Data Converters	2	SLWS006B	DW, N, PT
TLV320AC37	Data Converters	2	SLWS006B	DW, N, PT
TLV320AC56	Data Converters	2	SLWS044B	DW
TLV320AD543†	Data Converters	2	SLAS214	PT
TLV431A	Power Management Products	4	SLVS139A	DBV, LP
TLV5510	Data Converters	2	SLAS124	NS
TLV5535†	Data Converters	2	SLAS221	PW
TLV5580†	Data Converters	2	SLAS205A	DW,PW
TLV5590	Data Converters	2	SLAS134B	D
TLV5604	Data Converters	2	SLAS176A	D, PW
TLV5613	Data Converters	2	SLAS174A	DW, PW
TLV5614	Data Converters	2	SLAS188	D, PW
TLV5616	Data Converters	2	SLAS152A	D
TLV5619	Data Converters	2	SLAS172B	DW, PW
TLV5620	Data Converters	2	SLAS110A	D, N
TLV5621	Data Converters	2	SLAS138B	D, N
TLV5628	Data Converters	2	SLAS108A	DW, N
TLV5633†	Data Converters	2	SLAS190	DW,PW
TLV5636†	Data Converters	2	SLAS223	D,DGK
TLV5637†	Data Converters	2	SLAS224	D
TLV5638†	Data Converters	2	SLAS225	D
TLV5639†	Data Converters	2	SLAS189	DW,PW
TMS57014A	Data Converters	2	SLAS077D	DWB
TP3054A	Data Converters	2	SCTS026C	DW, N
TP3054B	Data Converters	2	SCTS042A	DW, N
TP3056B	Data Converters	2	SLWS072A	DW, N
TP3057A	Data Converters	2	SCTS026C	DW, N
TP3057B	Data Converters	2	SCTS042A	DW, N
TP3064B	Data Converters	2	SCTS031D	DW, N
TP3067A	Data Converters	2	SCTS025C	DW
TP3067B	Data Converters	2	SCTS031D	DW, N
TPA005D02	Amplifiers & Comparators	1	SLOS227A	DCA
TPA0102	Amplifiers & Comparators	1	SLOS166D	PWP
TPA0103	Amplifiers & Comparators	1	SLOS167	PWP
TPA0112†	Amplifiers & Comparators	1	SLOS204A	PWP
TPA0132†	Amplifiers & Comparators	1	SLOS223A	PWP
TPA0202	Amplifiers & Comparators	1	SLOS205	PWP
TPA102	Amplifiers & Comparators	1	SLOS213B	DGN
TPA112	Amplifiers & Comparators	1	SLOS212B	D, DGN
TPA122	Amplifiers & Comparators	1	SLOS211B	D, DGN
TPA1517	Amplifiers & Comparators	1	SLOS162A	DWP, NE
TPA152	Amplifiers & Comparators	1	SLOS210	D
TPA301	Amplifiers & Comparators	1	SLOS208B	D, DGN
TPA302	Amplifiers & Comparators	1	SLOS174A	D
TPA311	Amplifiers & Comparators	1	SLOS207A	D, DGN
TPA4860	Amplifiers & Comparators	1	SLOS164	D
TPA4861	Amplifiers & Comparators	1	SLOS163	D

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TI Device	Family	Section	Literature	Package
TPA701	Amplifiers & Comparators	1	SL0S229	D, DGN
TPA711	Amplifiers & Comparators	1	SL0S230	D, DGN
TPA721	Amplifiers & Comparators	1	SL0S231	D, DGN
TPIC0107B	Power Control Products	5	SLIS067	DWP
TPIC0108B	Power Control Products	5	SLIS068	DWP
TPIC1310	Power Drivers	5	SLIS071	KTR, KTS
TPIC2101	Power Drivers	5	SLIS060	D, N
TPIC2401	Power Drivers	5	SLIS049	KTA
TPIC2601	Power Drivers	5	SLIS048A	KTC
TPIC2603	Power Drivers	5	SLIS056A	DW, NE
TPIC2701	Power Drivers	5	SLIS019A	J, N
TPIC43T01	Power Drivers	5	SLIS081A	DA
TPIC44H01	Power Drivers	5	SLIS088	DA
TPIC44L01	Power Drivers	5	SLIS062A	DB
TPIC44L02	Power Drivers	5	SLIS062A	DB
TPIC44L03	Power Drivers	5	SLIS062A	DB
TPIC46L01	Power Drivers	5	SLIS055A	DB
TPIC46L02	Power Drivers	5	SLIS055A	DB
TPIC46L03	Power Drivers	5	SLIS055A	DB
TPIC6259	Power Drivers	5	SLIS009A	DW, N
TPIC6273	Power Drivers	5	SLIS011A	DW, N
TPIC6595	Power Drivers	5	SLIS010A	DW, N
TPIC6A259	Power Drivers	5	SLIS004B	DW, NE
TPIC6A595	Power Drivers	5	SLIS005A	DW, NE
TPIC6B259	Power Drivers	5	SLIS030	DW, N
TPIC6B273	Power Drivers	5	SLIS031	DW, N
TPIC6B595	Power Drivers	5	SLIS032	DW, N
TPIC6C595	Power Drivers	5	SLIS061	D, N
TPS1100	Power Management Products	4	SLVS078C	D, PW
TPS1101	Power Management Products	4	SLVS079C	D, PW
TPS1120	Power Management Products	4	SLVS080A	D
TPS2010	Power Management Products	4	SLVS097A	D, PW
TPS2011	Power Management Products	4	SLVS097A	D, PW
TPS2012	Power Management Products	4	SLVS097A	D, PW
TPS2013	Power Management Products	4	SLVS097A	D, PW
TPS2014	Power Management Products	4	SLVS159B	D, P
TPS2015	Power Management Products	4	SLVS159B	D, P
TPS2020†	Power Management Products	4	SLVS175	D,P
TPS2021†	Power Management Products	4	SLVS175	D,P
TPS2022†	Power Management Products	4	SLVS175	D,P
TPS2023†	Power Management Products	4	SLVS175	D,P
TPS2024†	Power Management Products	4	SLVS175	D,P
TPS2030†	Power Management Products	4	SLVS190	D,P
TPS2031†	Power Management Products	4	SLVS190	D,P
TPS2032†	Power Management Products	4	SLVS190	D,P
TPS2033†	Power Management Products	4	SLVS190	D,P
TPS2034†	Power Management Products	4	SLVS190	D,P

TI Device	Family	Section	Literature	Package
TPS2041	Power Management Products	4	SLVS172A	D, P
TPS2042	Power Management Products	4	SLVS173A	D, P
TPS2043†	Power Management Products	4	SLVS191	D
TPS2044	Power Management Products	4	SLVS174A	D
TPS2045†	Power Management Products	4	SLVS182	D,P
TPS2046†	Power Management Products	4	SLVS183	D,P
TPS2047†	Power Management Products	4	SLVS194	D
TPS2048†	Power Management Products	4	SLVS192	D
TPS2051	Power Management Products	4	SLVS172A	D, P
TPS2052	Power Management Products	4	SLVS173A	D, P
TPS2053†	Power Management Products	4	SLVS191	D
TPS2054	Power Management Products	4	SLVS174A	D
TPS2055†	Power Management Products	4	SLVS182	D,P
TPS2056†	Power Management Products	4	SLVS183	D,P
TPS2057†	Power Management Products	4	SLVS194	D
TPS2058†	Power Management Products	4	SLVS192	D
TPS2100†	Power Management Products	4	SLVS197	D, DBV
TPS2101†	Power Management Products	4	SLVS197	D, DBV
TPS2205	Power Management Products	4	SLVS128D	DB, DF
TPS2206	Power Management Products	4	SLVS138B	DAP, DB, DF
TPS2211	Power Management Products	4	SLVS156C	DB
TPS2212†	Power Management Products	4	SLVS193	DB
TPS2214†	Power Management Products	4	SLVS206	DB
TPS2216†	Power Management Products	4	SLVS179B	DAP,DB
TPS2811	Power Management Products	4	SLVS132D	D, P, PW
TPS2812	Power Management Products	4	SLVS132D	D, P, PW
TPS2813	Power Management Products	4	SLVS132D	D, P, PW
TPS2814	Power Management Products	4	SLVS132D	D, P, PW
TPS2815	Power Management Products	4	SLVS132D	D, P, PW
TPS2816	Power Management Products	4	SLVS160A	DBV
TPS2817	Power Management Products	4	SLVS160A	DBV
TPS2818	Power Management Products	4	SLVS160A	DBV
TPS2819	Power Management Products	4	SLVS160A	DBV
TPS2828	Power Management Products	4	SLVS160A	DBV
TPS2829	Power Management Products	4	SLVS160A	DBV
TPS2830†	Power Management Products	4	SLVS196A	D,PWP
TPS2831†	Power Management Products	4	SLVS196A	D,PWP
TPS2832†	Power Management Products	4	SLVS195A	D
TPS2833†	Power Management Products	4	SLVS195A	D
TPS3305-18†	Power Management Products	4	SLVS198	D,DGN
TPS3305-25†	Power Management Products	4	SLVS198	D,DGN
TPS3305-33†	Power Management Products	4	SLVS198	D,DGN
TPS3307-18†	Power Management Products	4	SLVS199	D,DGN
TPS3307-25†	Power Management Products	4	SLVS199	D,DGN
TPS3307-33†	Power Management Products	4	SLVS199	D,DGN
TPS3705-30†	Power Management Products	4	SLVS184B	D,DGN
TPS3705-33†	Power Management Products	4	SLVS184B	D,DGN

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TPS3705-50†	Power Management Products	4	SLVS184B	D,DGN
TPS3707-25†	Power Management Products	4	SLVS184B	D,DGN
TPS3707-30†	Power Management Products	4	SLVS184B	D,DGN
TPS3707-33†	Power Management Products	4	SLVS184B	D,DGN
TPS3707-50†	Power Management Products	4	SLVS184B	D,DGN
TPS3823-25	Power Management Products	4	SLVS165A	DBV
TPS3823-30	Power Management Products	4	SLVS165A	DBV
TPS3823-33	Power Management Products	4	SLVS165A	DBV
TPS3823-50	Power Management Products	4	SLVS165A	DBV
TPS3824-25	Power Management Products	4	SLVS165A	DBV
TPS3824-30	Power Management Products	4	SLVS165A	DBV
TPS3824-33	Power Management Products	4	SLVS165A	DBV
TPS3824-50	Power Management Products	4	SLVS165A	DBV
TPS5210	Power Management Products	4	SLVS171	DW
TPS5602†	Power Management Products	4	SLVS217	DBT
TPS56100†	Power Management Products	4	SLVS201	PWP
TPS5615	Power Management Products	4	SLVS177	O, PWP
TPS5618	Power Management Products	4	SLVS177	O, PWP
TPS5625	Power Management Products	4	SLVS177	O, PWP
TPS5633	Power Management Products	4	SLVS177	O, PWP
TPS5904	Power Management Products	4	SOES016D	P
TPS5904A	Power Management Products	4	SOES016D	P
TPS5908	Power Management Products	4	SOES030B	DCS, P
TPS5908A	Power Management Products	4	SOES030B	P
TPS60100†	Power Management Products	4	SLVS213A	PWP
TPS6734	Power Management Products	4	SLVS127	D, P
TPS6735	Power Management Products	4	SLVS141A	D, P
TPS6755	Power Management Products	4	SLVS155	D, P
TPS7101	Power Management Products	4	SLVS092F	D, P, PW
TPS71025	Power Management Products	4	SLVS162A	D, P, PW
TPS7133	Power Management Products	4	SLVS092F	D, P, PW, PWP
TPS7148	Power Management Products	4	SLVS092F	D, P, PW
TPS7150	Power Management Products	4	SLVS092F	D, P, PW, PWP
TPS71H01	Power Management Products	4	SLVS152A	PWP
TPS71H33	Power Management Products	4	SLVS152A	PWP
TPS71H48	Power Management Products	4	SLVS152A	PWP
TPS71H50	Power Management Products	4	SLVS152A	PW
TPS7201	Power Management Products	4	SLVS102E	D, P, PW
TPS7225	Power Management Products	4	SLVS102F	D, P, PW
TPS7230	Power Management Products	4	SLVS102F	D, P, PW
TPS7233	Power Management Products	4	SLVS102E	D, P, PW
TPS7248	Power Management Products	4	SLVS102E	D, P, PW
TPS7250	Power Management Products	4	SLVS102E	D, P, PW
TPS7301	Power Management Products	4	SLVS124E	D, P, PW
TPS7330	Power Management Products	4	SLVS124E	D
TPS7333	Power Management Products	4	SLVS124E	D, P, PW
TPS7348	Power Management Products	4	SLVS124E	D, P, PW

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TPS7350	Power Management Products	4	SLVS124E	D, P, PW
TPS73HD301	Power Management Products	4	SLVS167	PW
TPS73HD318†	Power Management Products	4	SLVS167C	PWP
TPS73HD325†	Power Management Products	4	SLVS167C	PWP
TPS76030	Power Management Products	4	SLVS144A	DBV
TPS76032	Power Management Products	4	SLVS144A	DBV
TPS76033	Power Management Products	4	SLVS144A	DBV
TPS76038	Power Management Products	4	SLVS144A	DBV
TPS76050	Power Management Products	4	SLVS144A	DBV
TPS76130†	Power Management Products	4	SLVS178A	DBV
TPS76132†	Power Management Products	4	SLVS178A	DBV
TPS76133†	Power Management Products	4	SLVS178A	DBV
TPS76138†	Power Management Products	4	SLVS178A	DBV
TPS76150†	Power Management Products	4	SLVS178A	DBV
TPS76301†	Power Management Products	4	SLVS181D	DBV
TPS76316†	Power Management Products	4	SLVS181D	DBV
TPS76318†	Power Management Products	4	SLVS181D	DBV
TPS76325†	Power Management Products	4	SLVS181D	DBV
TPS76333†	Power Management Products	4	SLVS181D	DBV
TPS76338†	Power Management Products	4	SLVS181D	DBV
TPS76350†	Power Management Products	4	SLVS181D	DBV
TPS76425†	Power Management Products	4	SLVS180A	DBV
TPS76427†	Power Management Products	4	SLVS180A	DBV
TPS76430†	Power Management Products	4	SLVS180A	DBV
TPS76433†	Power Management Products	4	SLVS180A	DBV
TPS9103	Power Management Products	4	SLVS131A	PW
TPS9104	Power Management Products	4	SLVS133A	PT
TPS9111	Power Management Products	4	SLVS134A	PW
TRF1015†	RF Products	8	SLWS021D	DB
TRF1020†	RF Products	8	SLWS028B	PFB
TRF1500†	RF Products	8	SLWS041A	PFB
TRF2020†	RF Products	8	SLWS020B	PW
TRF2050†	RF Products	8	SLWS030D	PW
TRF3520†	RF Products	8	SLWS060A	PFB
TRF4000†	RF Products	8	SLWS050	PWP
TRF4002†	RF Products	8	SLWS051	PWP
TRF7003†	RF Products	8	SLWS058B	PK
TRF7610†	RF Products	8	SLWS059B	PWP
TRF8010†	RF Products	8	SLWS031B	PWP
TRF8011†	RF Products	8	SLWS056B	PWP
TSB11LV01	Interface Products	3	SLLS232B	PT
TSB12C01A	Interface Products	3	SLLS219A	PZ, WN
TSB12LV01A†	Interface Products	3	SLLS332	PZ
TSB12LV21A	Interface Products	3	SLLS273	PGF
TSB12LV21B	Interface Products	3	SLLS306	PGF, PZ
TSB12LV22	Interface Products	3	SLLS290	PZ
TSB12LV23†	Interface Products	3	SLLS328A	PZ

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TSB12LV31	Interface Products	3	SLLS255A	PZ
TSB12LV41	Interface Products	3	SLLS276	PZ
TSB12LV41A†	Interface Products	3	SLLS339	PZ
TSB12LV42	Interface Products	3	SLLS293	PZ
TSB14C01A	Interface Products	3	SLLS284	PM
TSB21LV03C†	Interface Products	3	SLLS331	PM
TSB41LV02†	Interface Products	3	SLLS355	PAP
TSB41LV03	Interface Products	3	SLLS317	PFP
TSB41LV06†	Interface Products	3	SLLS289	PZP
TUSB2040A	Interface Products	3	SLLS288B	N, PT
TUSB2043†	Interface Products	3	SLLS308	VF
TUSB2046†	Interface Products	3	SLLS330	VF
TUSB2070	Interface Products	3	SLLS239B	PT
TUSB2140B	Interface Products	3	SLLS31	
TWL1101	Data Converters	2	SLWS074	PFB
UA723	Power Management Products	4	SLVS057C	D, J, N
UA741	Amplifiers & Comparators	1	SLOS094A	D, JG, P
UA7805	Power Management Products	4	SLVS056B	KC, KTE
UA7806	Power Management Products	4	SLVS056B	KC, KTE
UA7808	Power Management Products	4	SLVS056B	KC, KTE
UA7810	Power Management Products	4	SLVS056B	KC, KTE
UA7812	Power Management Products	4	SLVS056B	KC, KTE
UA7815	Power Management Products	4	SLVS056B	KC, KTE
UA7818	Power Management Products	4	SLVS056B	KC
UA7824	Power Management Products	4	SLVS056B	KC
UA7885	Power Management Products	4	SLVS056C	KC, KTE
UA78L02A	Power Management Products	4	SLVS010E	D, LP
UA78L05	Power Management Products	4	SLVS010E	D, LP
UA78L05A	Power Management Products	4	SLVS010E	D, LP
UA78L06	Power Management Products	4	SLVS010E	LP
UA78L06A	Power Management Products	4	SLVS010E	D, LP
UA78L08	Power Management Products	4	SLVS010E	D, LP
UA78L08A	Power Management Products	4	SLVS010E	D, LP
UA78L09	Power Management Products	4	SLVS010E	LP
UA78L09A	Power Management Products	4	SLVS010E	D, LP
UA78L10	Power Management Products	4	SLVS010E	D, LP
UA78L10A	Power Management Products	4	SLVS010E	D, LP
UA78L12	Power Management Products	4	SLVS010E	D, LP
UA78L12A	Power Management Products	4	SLVS010E	D, LP
UA78L15	Power Management Products	4	SLVS010E	D, LP
UA78L15A	Power Management Products	4	SLVS010E	D, LP
UA78M05	Power Management Products	4	SLVS059B	KC, KTP
UA78M06	Power Management Products	4	SLVS059B	KC, KTP
UA78M08	Power Management Products	4	SLVS059B	KC, KTP
UA78M09	Power Management Products	4	SLVS059B	KC, KTP
UA78M10	Power Management Products	4	SLVS059B	KC, KTP
UA78M12	Power Management Products	4	SLVS059B	KC, KTP

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UA78M15	Power Management Products	4	SLVS059B	KC, KTP
UA79M05	Power Management Products	4	SLVS060C	KC, KTP
UA79M08	Power Management Products	4	SLVS060C	KC, KTP
UA79M12	Power Management Products	4	SLVS060C	KC, KTP
UA79M15	Power Management Products	4	SLVS060C	KC, KTP
UA9636A	Interface Products	3	SLLS110B	D, JG, P
UA9637A	Interface Products	3	SLLS111B	D, JG, P
UA9638	Interface Products	3	SLLS112C	D, P
UA9639	Interface Products	3	SLLS113C	D, P
UC2843	Power Management Products	4	SLVS038B	D, P
UC2844	Power Management Products	4	SLVS038B	D, P
UC2845	Power Management Products	4	SLVS038B	D, P
UC3842	Power Management Products	4	SLVS038B	D, P
UC3843	Power Management Products	4	SLVS038B	D, P
UC3844	Power Management Products	4	SLVS038B	D, P
UC3845	Power Management Products	4	SLVS038B	D, P
ULN2002A	Power Drivers	5	SLRS027	D, N
ULN2003A	Power Drivers	5	SLRS027	D, J, N
ULN2004A	Power Drivers	5	SLRS027	D, N

